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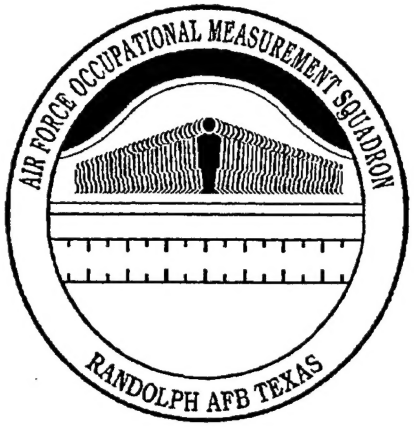

OCCUPATIONAL SURVEY REPORT

HEATING, VENTILATION, AIR CONDITIONING AND REFRIGERATION

AFSC 3E1X1

AFPT 90-3E1-025

JULY 1996

OCCUPATIONAL ANALYSIS PROGRAM
AIR FORCE OCCUPATIONAL MEASUREMENT SQUADRON
AIR EDUCATION and TRAINING COMMAND
1550 5th STREET EAST
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PREFACE

This report presents the results of an Air Force Occupational Survey of the Heating, Ventilation, Air Conditioning and Refrigeration career ladder, Air Force Specialty Code (AFSC) 3E1X1. Authority for conducting occupational surveys is contained in AFI 36-2623. Computer products used in this report are available for use by operations and training officials.

The survey instrument was developed by Captain Shannon M. Batchelor, Inventory Development Specialist, with computer programming support furnished by Mr. Wayne J. Fruge. Mr. Richard G. Ramos provided administrative support. 2Lt Scott M. Foley, Occupational Analyst, analyzed the data and wrote the final report. This report has been reviewed and approved by Mr. James B. Keeth, Chief, Airman Analysis Section, Occupational Analysis Flight, Air Force Occupational Measurement Squadron (AFOMS).

Copies of this report are distributed to Air Staff sections, major commands, and other interested training and management personnel. Additional copies are available upon request to AFOMS, Attention: Chief, Occupational Analysis Flight (OMY), 1550 5th Street East, Randolph Air Force Base, Texas 78150-4449 (DSN 487-6623).

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SUMMARY OF RESULTS

1. *Survey Coverage*: The Heating, Ventilation, Air Conditioning and Refrigeration (HVAC/R) career ladder was surveyed to provide current job and task data for use in updating career ladder documents and training programs. Survey results are based on responses from 917 respondents, accounting for 74 percent of the personnel surveyed.

2. *Specialty Jobs*: Eight jobs were identified in the career ladder structure analysis. Six of the jobs are almost totally oriented toward technical task performance. The remaining two jobs are primarily supervisory and management in nature.

3. *Career Ladder Progression*: Skill-level progression for members of this AFSC is typical of most career ladders. Personnel at the 3- and 5-skill levels work in the technical jobs of the career ladder and spend most of their time on technical tasks involving the maintenance of HVAC/R systems. As incumbents move up to the 7-skill level, higher percentages work in the supervisory jobs, but many personnel still spend some time maintaining HVAC/R systems. At the 9-skill level, individuals have moved away from the technical job completely and are performing a supervisory and management job.

4. *AFMAN 36-2108 Specialty Description*: The Specialty Description in AFMAN 36-2108 provides a broad and generally accurate description of the jobs and tasks dealing with heating, ventilation, air conditioning and refrigeration systems repair and maintenance functions.

5. *Training Analysis*: Overall, the AFSC 3E1X1 Specialty Training Standard (STS), dated 1 November 1995, was generally supported by the Occupational Survey Report (OSR) data. Subject-matter experts, however, should carefully review the STS for possible fine-tuning of content and proficiency codes, since this is a very diverse career ladder and personnel work on many different systems and pieces of equipment.

6. *Job Satisfaction*: In general, job satisfaction among AFSC 3E1X1 personnel is fairly high. It is evident the merger of AFSCs 545X0, 545X2, and 545X3 in October 1993 has had a positive impact on overall satisfaction of career ladder personnel, especially those in their first- or second-enlistment. These individuals express higher job interest and feel their talents and training are being used more effectively than expressed by respondents to the last OSRs. Review of the job satisfaction data for personnel in the specialty jobs reveals that those in the Steam and Hot Water, Mobility, and Functional Manager jobs showed the lowest indicators.

6. *Implications*: The current AFSC 3E1X1 career ladder structure reflects an overall normal job progression. It appears the merged job structure is working well. Six jobs were identified which involved systems maintenance. The other two jobs identified were mainly supervisory or managerial in nature. AFMAN 36-2108 *Specialty Descriptions* broadly describe the maintenance tasks being performed. Job satisfaction is fairly high among career ladder incumbents. The career training ladder documents are well supported, but should be given a thorough review due to the wide diversity of equipment involved.

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OCCUPATIONAL SURVEY REPORT (OSR)
HEATING, VENTILATION, AIR CONDITIONING, AND REFRIGERATION (HVAC/R) CAREER LADDER
(AFSC 3E1X1)

INTRODUCTION

This is a report of an occupational survey of the Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC/R) career ladder conducted by the Air Force Occupational Measurement Squadron (AFOMS). The current HVAC/R career ladder was created in October 1992 with the merger of three civil engineering AFSCs: (1) AFSC 545X0 (Refrigeration and Air Conditioning), (2) AFSC 545X2 (Heating Systems), and (3) AFSC 545X3 (CE Control Systems). This is the first survey conducted on this AFSC since the 1992 merger. Survey data will be used to identify current utilization patterns among career ladder personnel and evaluate career ladder documents and training programs. The last OSR published for each of the three merged AFSCs are listed below:

AFSC 545X0 - June 1992 (consisted of a job structure report only)
AFSC 545X2 - January 1985
AFSC 545X3 - January 1988

Background

As described in the AFMAN 36-2108 *Specialty Description*, dated October 1994, HVAC/R members install and operate HVAC/R systems and equipment; interpret drawings and schematics and install HVAC/R components; install, repair, fabricate, and test piping and tubing systems; test HVAC/R equipment for proper operation; balance air and water in HVAC/R systems; monitor system operation to ensure efficiency and compliance with technical orders, manufacturer handbooks, local procedures, codes and directives; perform industrial water treatment for heating and cooling systems; and ensure compliance with safety and environmental regulations for fuels, refrigerates, and hazardous materials.

HVAC/R personnel also maintain and repair HVAC/R equipment and systems; perform recurring maintenance and seasonal overhaul on systems and components; troubleshoot malfunctions; repair or replace components; and modify equipment for specific missions or to increase efficiency. They also calibrate test equipment to ensure accuracy; advise on problems installing and repairing HVAC/R equipment and systems; solve maintenance problems by studying layout drawings, wiring, and schematic drawings and analyzing construction and operating characteristics; and develop and establish operation and maintenance procedures to

ensure maximum efficiency. In addition, they perform planning activities and facility surveys, survey proposed work to determine resource requirements, prepare cost estimates for in-service work, and apply engineered performance standards to plan and estimate jobs.

As with all civil engineering career ladders, this is a contingency-related career ladder. HVAC/R personnel may participate in recovery operation as a result of natural and manmade disasters, or be subject to deployment and employment in hostile environments. Individuals should have knowledge of contingency skills such as first aid procedures, field sanitation and hygiene, work party security, repair and construction methods, Bedouin procedures, personal weapons, and chemical warfare defense.

Personnel entering the AFSC 3E1X1 career ladder must complete the 17-week HVAC/R Apprentice course at Sheppard AFB TX. As of October 1995, the Apprentice course became an interservice course, with both Air Force and Navy personnel attending. At the present time, the course Plan of Instruction is being rewritten and updated. The new course will include such learning topics as fundamentals of refrigeration, air conditioning and air compressors; trouble analysis and maintenance of refrigeration and air conditioning systems, including hermetic and open-type condensing units with air and water cooled condensers. Additionally, general and specific contingency training and equipment required to meet wartime needs are taught.

Entry into this career ladder currently requires an Armed Forces Vocational Aptitude Test Battery score of MECHANICAL - 51 and ELECTRONIC - 33; a strength factor of "P" (weight lift of 110 lbs) is also required.

SURVEY METHODOLOGY

Inventory Development

The data collection instrument for this occupational survey was USAF Job Inventory (JI) Air Force Personnel Test 90-545-025, dated September 1993. A tentative task list was prepared after reviewing pertinent career ladder publications and directives, pertinent tasks from the previous survey instrument, and data from the last OSR. The preliminary task list was refined and validated through personal interviews with 36 subject-matter experts (SMEs) at the technical training location and at the following installations:

BASE	UNIT VISITED
Sheppard AFB TX	363 TCHTS/TTOC
Peterson AFB CO	21 CES/CEO
Wright-Patterson AFB OH	645 CEG/CEOP
Hurlburt Field FL	823 RHCES/TT
Eglin AFB FL	646 CES/CEOFI

The resulting JI contains a comprehensive listing of 1,232 tasks grouped under 19 duty headings, and a background section requesting such information as grade, major command (MAJCOM) assigned, organizational level, job title, functional area, HVAC/R control systems operated or maintained, systems or equipment maintained, and equipment or tools used in present job.

Survey Administration

From January through April 1995, Survey Control Monitors at base training units worldwide administered the inventory to selected eligible AFSC 3E1X1 personnel. A stratified random sample consisting of 50 percent of assigned military members were selected for the survey. Military members eligible for the survey consisted of the total assigned 3-, 5-, 7-, and 9-skill level population, excluding the following: (1) hospitalized personnel; (2) personnel in transition for a permanent change of station; (3) personnel retiring within the time the inventories were administered to the field; and (4) personnel in their job less than 6 weeks. Job incumbents were selected from a computer-generated mailing list obtained from personnel data tapes maintained by the Air Force Personnel Center, Randolph AFB TX.

In addition to surveying military AFSC 3E1X1 personnel, booklets were also sent to civilians holding a Wage Grade (WG) of 8, 9, or 10 in Occupational Series 4742, 4749, 5306, 5352, 5406, or 2606. Their participation in this survey was voluntary. Civilians were surveyed to obtain information regarding their participation in the civil engineering multiskilling initiative. Unfortunately, useable booklets were received from only a small number of civilian respondents. As a result of this low return, civilian data are not reported in this OSR.

Each individual who completed the inventory first completed an identification and biographical information section and then checked each task performed in his or her current job. After checking all tasks performed, each member then rated each of these tasks on a 9-point scale, showing relative time spent on that task, as compared to all other tasks checked. The ratings ranged from 1 (very small amount time spent) through 5 (about average time spent) to 9

(very large amount time spent). To determine relative time spent for each task checked by a respondent, all of the incumbent's ratings are assumed to account for 100 percent of his or her time spent on the job and are summed. Each task rating is then divided by the total task ratings and multiplied by 100 to provide a relative percentage of time for each task. This procedure provides a basis for comparing tasks in terms of both percent members performing and average percent time spent.

Survey Sample

Military personnel were selected to participate in this survey so as to ensure an accurate representation across MAJCOMs and paygrade groups. Table 1 reflects the percentage distribution, by MAJCOM, of assigned AFSC 3E1X1 personnel as of January 1995. The 917 military respondents in the final sample represent 33 percent of the total assigned personnel and 74 percent of the total personnel surveyed. Table 2 reflects the paygrade distribution for these AFSC 3E1X1 personnel. The survey sample is considered to be a satisfactory representation of the overall career ladder population.

TABLE 1

COMMAND DISTRIBUTION OF 3E1X1 PERSONNEL

COMMAND	PERCENT OF ASSIGNED*	PERCENT OF SAMPLE
ACC	31	29
AFMC	15	22
AMC	12	11
PACAF	12	10
AETC	10	9
AFSPACE	9	8
USAFE	7	6
OTHER	4	5

TOTAL MILITARY ASSIGNED* = 2,775
TOTAL MILITARY SURVEYED** = 1,239
TOTAL MILITARY IN SURVEY SAMPLE = 917
PERCENT OF ASSIGNED IN SAMPLE = 33%
PERCENT OF SURVEYED IN SAMPLE = 74%

* Assigned strength as of January 1995
** Excludes personnel in PCS, student, or hospital status, or less than 6 weeks on the job

TABLE 2

PAYGRADE DISTRIBUTION OF SURVEY SAMPLE

GRADE	PERCENT OF ASSIGNED*	PERCENT OF SAMPLE
E-1 - E-3	27	28
E-4	25	24
E-5	23	23
E-6	14	14
E-7	10	10
E-8	1	1

* Assigned strength as of March 1995

Task Factor Administration

Job descriptions alone do not provide sufficient data for making decisions about career ladder documents or training programs. Task factor information is needed for a complete analysis of the career ladder. To obtain the needed task factor data, selected senior AFSC 3E1X1 personnel (generally E-6 or E-7 craftsmen) also completed a second booklet for either training emphasis (TE) or task difficulty (TD). These booklets were processed separately from the JIs. This information is used in a number of different analyses discussed in more detail within the report.

Training Emphasis (TE): TE is a rating of the amount of emphasis that should be placed on tasks in entry-level training. The 47 senior NCOs who completed a TE booklet were asked to select tasks they felt required some sort of structured training for entry-level personnel, and then indicate how much training emphasis these tasks should receive, from 1 (extremely low emphasis) to 9 (extremely high emphasis). Structured training is defined as training provided at resident technical schools, field training detachments, mobile training teams, formal on-the-job training (OJT), or any other organized training method. Interrater agreement for these 47 raters was acceptable. The average TE rating was 3.25, with a standard deviation of 1.48. Any task with a TE rating of 4.73 or above is considered to have high TE.

Task Difficulty (TD): TD is an estimate of the amount of time needed to learn how to do each task satisfactorily. The 65 senior NCOs who completed TD booklets were asked to rate the difficulty of each task using a 9-point scale (extremely low to extremely high). Interrater reliability was acceptable. Ratings were standardized so tasks have an average difficulty of 5.00 and a standard deviation of 1.00. Any task with a TD rating of 6.00 or above is considered to be difficult to learn.

When used in conjunction with the primary criterion of percent members performing, TE and TD ratings can provide insight into first-enlistment personnel training requirements. Such insights may suggest a need for lengthening or shortening portions of instruction supporting entry-level jobs.

SPECIALTY JOBS
(Career Ladder Structure)

A USAF Occupational Analysis begins with an examination of the career ladder structure. The structure of jobs within the HVAC/R career ladder was examined on the basis of similarity of tasks performed and the percent of time spent ratings provided by job incumbents, independent of other specialty background factors.

Each individual in the sample performs a set of tasks called a *Job*. For the purpose of organizing individual jobs into similar units of work, an automated job clustering program is used. This hierarchical grouping program is a basic part of the Comprehensive Occupational Data Analysis Program (CODAP) system for job analysis. Each individual job description (all the tasks performed by that individual and the relative amount of time spent on those tasks) in the sample is compared to every other job description in terms of tasks performed and the relative amount of time spent on each task in the JI. The automated system is designed to locate the two job descriptions with the most similar tasks and percent time ratings and combine them to form a composite job description. In successive stages, new members are added to initial groups, or new groups are formed based on the similarity of tasks performed and similar time ratings in the individual job descriptions.

Overview of Specialty Jobs

The analysis procedure described above identified eight jobs within the survey sample. The division of jobs performed by DAFSC 3E1X1 personnel is illustrated in Figure 1, and a listing of those jobs is provided below. The group (GP) or stage (ST) number shown beside each title is a reference to computer-printed information; the number of personnel in each group or stage (N) is also shown.

I. ENTRY-LEVEL JOB (ST094, N=100)

II. GENERAL HVAC/R TECHNICIAN CLUSTER (ST105, N=473)

III. STEAM AND HOT WATER JOB (ST147, N=5)

IV. STEAM PLANT JOB (ST183, N=40)

V. QUALITY ASSURANCE JOB (ST295, N=6)

VI. MOBILITY JOB (ST052, N=31)

VII. SUPERVISOR JOB (ST069, N=114)

VIII. FUNCTIONAL MANAGER JOB (ST132, N=6)

The respondents forming these jobs account for 85 percent of the survey sample. The remaining 15 percent, for one reason or another, did not fall into one of these jobs. Examples of job titles for these people include Technical Analyst, CDC Writer, Alarm Line Technician, and HVAC/R Systems Planner.

AFSC 3E1X1 CAREER LADDER JOBS
(N = 917)

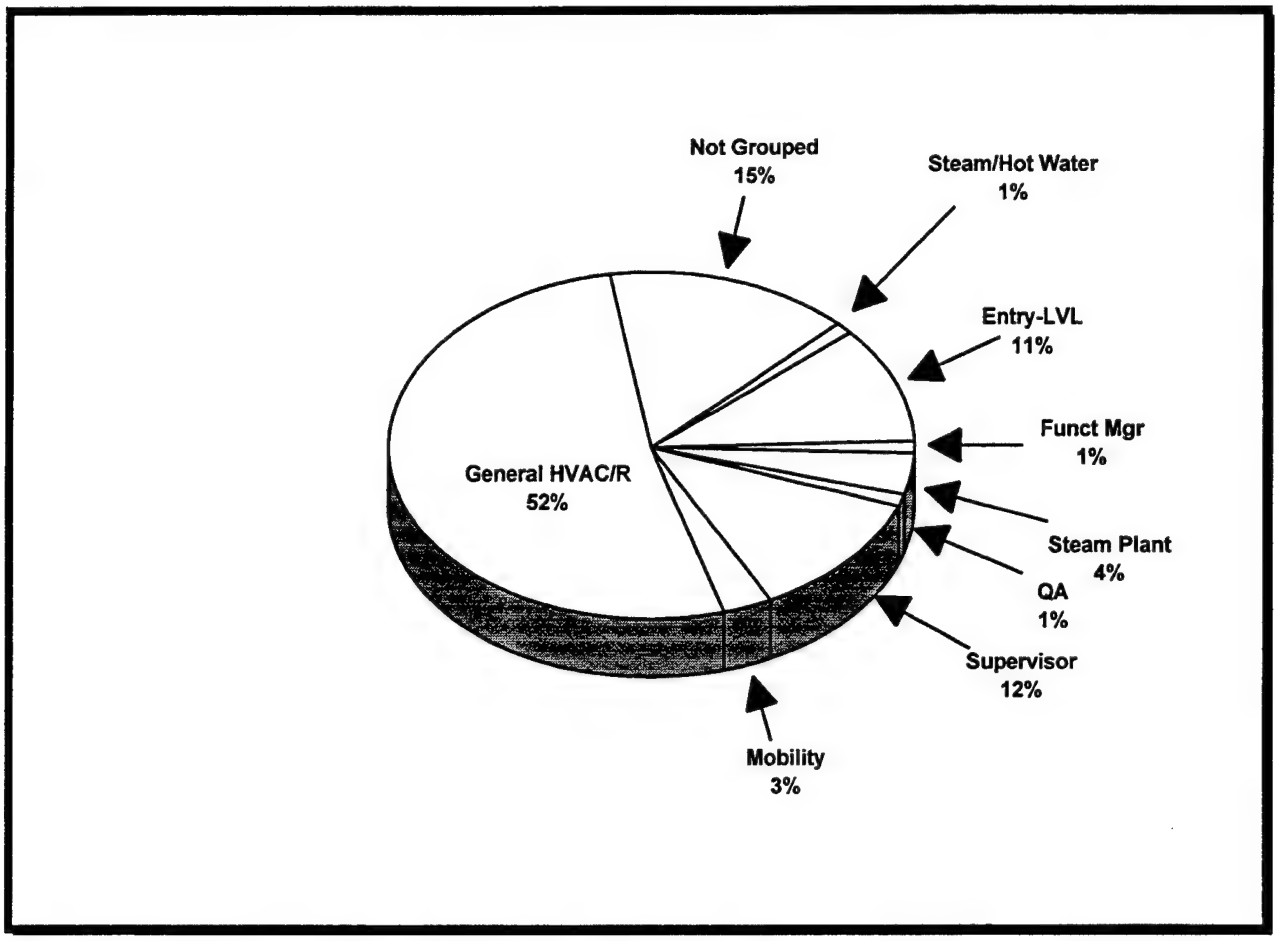

FIGURE 1

Group Descriptions

The following paragraphs contain brief descriptions of the jobs identified through the career ladder structure analysis. Table 3 presents the relative time spent on duties by members of these specialty jobs. Selected background data for these jobs are provided in Table 4. Representative tasks for all the groups are contained in Appendix A.

TABLE 3

RELATIVE PERCENT TIME SPENT ON DUTIES BY SPECIALTY JOBS

DUTIES	ENTRY LEVEL JOB (ST094) (N=100)	GENERAL HVAC/R TECHNICIAN (ST105) (N=473)	STEAM/HOT WATER JOB (ST147) (N=5)	STEAM PLANT JOB (ST183) (N=40)	QUALITY ASSURANCE JOB (ST295) (N=6)
A ORGANIZING AND PLANNING	2	2	2	3	5
B DIRECTING AND IMPLEMENTING	2	2	3	3	4
C INSPECTING AND EVALUATING	1	2	2	3	12
D TRAINING	*	1	1	2	1
E PERFORMING ADMINISTRATIVE AND MAINTENANCE MANAGEMENT ACTIVITIES	1	1	1	2	4
F PERFORMING GENERAL HEATING, VENTILATING, AIR CONDITIONING AND REFRIGERATION ACTIVITIES	18	10	34	11	3
G MAINTAINING HVAC/R SYSTEMS	31	27	33	16	53
H MAINTAINING HVAC/R ELECTRICAL COMPONENTS AND CIRCUITRY	14	14	2	5	6
I MAINTAINING HVAC/R CONTROLS	3	7	1	2	1
J MAINTAINING HVAC/R FUEL SYSTEMS AND BURNERS	2	2	4	4	1
K MAINTAINING STEAM AND HOT WATER GENERATING EQUIPMENT	2	3	7	14	2
L MAINTAINING AIR CONDITIONING AND REFRIGERATION SYSTEMS	11	10	2	1	*
M MAINTAINING AIR COMPRESSING EQUIPMENT	3	5	*	2	6
N MAINTAINING WARM AIR HEATING, RADIANT HEATING, AND KITCHEN EQUIPMENT	2	2	1	1	1
O MAINTAINING ALTERNATE HEATING EQUIPMENT	*	*	*	*	*
P PERFORMING INDUSTRIAL WATER CORROSION AND TREATMENT ACTIVITIES	1	1	*	8	*
Q MAINTAINING CENTRAL STEAM PLANTS	*	*	*	13	1
R PERFORMING ENVIRONMENTAL PROTECTION ACTIVITIES	1	1	*	*	*
S PERFORMING PRIME BEEF, CONTINGENCY, OR TACTICAL TEAM ACTIVITIES	7	7	7	9	3

* Denotes less than .5 percent

TABLE 3 (CONTINUED)

RELATIVE PERCENT TIME SPENT ON DUTIES BY SPECIALTY JOBS

DUTIES	MOBILITY JOB (ST052) (N= 31)	SUPERVISOR JOB (ST069) (N= 114)	FUNCTIONAL MANAGER JOB (ST132) (N= 6)
A ORGANIZING AND PLANNING	11	20	37
B DIRECTING AND IMPLEMENTING	9	21	22
C INSPECTING AND EVALUATING	8	25	17
D TRAINING	2	7	3
E PERFORMING ADMINISTRATIVE AND MAINTENANCE MANAGEMENT ACTIVITIES	4	7	9
F PERFORMING GENERAL HEATING, VENTILATING, AIR CONDITIONING AND REFRIGERATION ACTIVITIES	4	1	*
G MAINTAINING HVAC/R SYSTEMS	3	2	4
H MAINTAINING HVAC/R ELECTRICAL COMPONENTS AND CIRCUITRY	1	2	3
I MAINTAINING HVAC/R CONTROLS	2	2	*
J MAINTAINING HVAC/R FUEL SYSTEMS AND BURNERS	*	*	*
K MAINTAINING STEAM AND HOT WATER GENERATING EQUIPMENT	1	*	*
L MAINTAINING AIR CONDITIONING AND REFRIGERATION SYSTEMS	2	1	*
M MAINTAINING AIR COMPRESSING EQUIPMENT	*	*	*
N MAINTAINING WARM AIR HEATING, RADIANT HEATING, AND KITCHEN EQUIPMENT	1	*	*
O MAINTAINING ALTERNATE HEATING EQUIPMENT	*	*	*
P PERFORMING INDUSTRIAL WATER CORROSION AND TREATMENT ACTIVITIES	1	*	*
Q MAINTAINING CENTRAL STEAM PLANTS	*	*	*
R PERFORMING ENVIRONMENTAL PROTECTION ACTIVITIES	1	1	*
S PERFORMING PRIME BEEF, CONTINGENCY, OR TACTICAL TEAM ACTIVITIES	50	12	4

* Denotes less than .5 percent

TABLE 4

SELECTED BACKGROUND DATA FOR SPECIALTY JOBS

	ENTRY LEVEL JOB (ST094)	GENERAL HVAC/R TECHNICIAN (ST105)	STEAM/HOT WATER JOB (ST147)	STEAM PLANT JOB (ST183)	QUALITY ASSURANCE JOB (ST295)
NUMBER IN GROUP	100	473	5	40	6
PERCENT OF SAMPLE	11%	52%	1%	4%	1%
PERCENT IN CONUS	72%	82%	80%	98%	33%
DAFSC DISTRIBUTION:					
3E131	53%	33%	60%	20%	0%
3E151	43%	56%	20%	68%	17%
3E171	4%	11%	20%	12%	83%
3E191	0%	0%	0%	0%	0%
PREDOMINANT GRADE(S)	E-3 - E-4	E-3 - E5	E-4 - E-6	E-4 - E-5	E-7
AVERAGE MONTHS IN CAREER FIELD	49	78	69	97	142
AVERAGE MONTHS IN SERVICE	57	90	70	113	178
PERCENT IN FIRST ENLISTMENT (1-48 MOS TAFMS)	58%	38%	60%	24%	0%
PERCENT SUPERVISING	12%	32%	20%	52%	17%
AVERAGE NUMBER OF TASKS PERFORMED	119	351	88	251	70

TABLE 4 (CONTINUED)

SELECTED BACKGROUND DATA FOR SPECIALTY JOBS

	MOBILITY JOB (ST052)	SUPERVISOR JOB (ST069)	FUNCTIONAL MANAGER JOB (ST132)
NUMBER IN GROUP	31	114	6
PERCENT OF SAMPLE	3%	12%	1%
PERCENT IN CONUS	81%	80%	50%
DAFSC DISTRIBUTION:			
3E131	16%	1%	0%
3E151	29%	11%	0%
3E171	49%	78%	67%
3E191	6%	10%	33%
PREDOMINANT GRADE(S)	E-5 - E-7	E-7	E-7
AVERAGE MONTHS IN CAREER FIELD	122	167	91
AVERAGE MONTHS IN SERVICE	168	207	209
PERCENT IN FIRST ENLISTMENT (1-48 MOS TAFMS)	16%	1%	0%
PERCENT SUPERVISING	18%	84%	34%
AVERAGE NUMBER OF TASKS PERFORMED	56	91	42

I. ENTRY-LEVEL JOB (ST094). The 100 airmen forming this job (11 percent of the survey sample) are primarily young airmen new to the career ladder. They perform very general tasks. Their job is similar to that of Group II below, but they perform far fewer tasks (119 versus 351) and they primarily work on air conditioning and refrigeration systems. Their responsibilities include such things as troubleshooting air conditioning systems, and performing Recurring Work Program (RWP) inspections or Periodic Maintenance Inspections (PMI) on HVAC/R systems. Distinctive tasks performed include:

remove or replace three-phase electric motors
install air filters
clean air filters
adjust drive belt tension
clean drains on HVAC/R equipment
bend copper tubing
locate refrigerant leaks using soap solutions
align motors
measure and cut pipe by hand
wire control circuits

The majority of these airmen hold either a 3-skill level (53 percent) or a 5-skill level (43 percent). Fifty-eight percent are in their first enlistment. The average time in the career field is 4 years. The predominant paygrades are E-3 and E-4. Furthermore, 72 percent of these members report they are assigned to units within the United States.

II GENERAL HVAC/R TECHNICIAN CLUSTER (ST105). The 473 airmen forming this cluster (52 percent of the survey sample and the largest job identified) are responsible for the core work of the career ladder. These individuals are involved with all aspects of the HVAC/R job, from air conditioning and heating systems to HVAC/R controls. Additionally, they spend more time in Duty M (Maintaining Air Compressing Equipment) than any other group. Their responsibilities include the performance of various inspections, operating and maintaining HVAC/R systems, aligning pulleys, and inspecting air handler vents. Furthermore, they perform an average of 351 tasks, far more than any other group. Distinct tasks performed include:

remove or replace three-phase electric motors
align and tighten V-belts
inspect gauges or lines
install air filters
inspect motor or fan bearings
reset circuit breakers
align motors

inspect fuses or circuit breakers
troubleshoot electrical motors
install circulating pumps

As with the Entry-Level job, the predominant paygrades in this job are E-3 and E-4. Differing is the emergence of a large share of E-5s (29 percent versus 14 percent). Their average time in service is 6 1/2 years.

III. STEAM AND HOT WATER JOB (ST147). The five airmen forming this job (1 percent of the survey sample) are performing one of two jobs responsible for maintaining steam and hot water generating equipment. Their responsibilities include installing check valves and high-pressure safety values, along with removing and replacing gauges and isolating malfunctions in various steam and hot water systems. The job is highly technical, with over 60 percent of their relative job time devoted to the performance of maintenance functions. This job is somewhat specialized, as opposed to the Steam Plant job (88 tasks versus 251 tasks). These individuals spend more time on general tasks and are not involved with central steam plants or industrial water corrosion treatment as their counterparts in the Steam Plant Job. Typical of their average 88 tasks performed are:

remove or replace steam heating system valves or fittings, other than safety or pressure relief
assemble high- or low-pressure fittings
clean strainers
install black iron steam condensate lines
remove or replace flange gaskets
remove or replace steam valves
troubleshoot steam heating systems or boilers
remove or replace piping or tubing, such as water, refrigerant or fuel lines
inspect steam traps
remove or replace steam heating system safety valves

The majority of these airmen (60 percent) hold a 3-skill level. The average time in the career field is 6 years. The paygrades range from E-2 to E-5, with E-2 being the predominant paygrade. Furthermore, 80 percent of these members report they are assigned to units within the United States.

IV. STEAM PLANT JOB (ST183). Comprising 4 percent of the survey sample, these 40 airmen are similar to the job discussed above, with responsibilities for maintaining much of the same equipment. However, these individuals are more experienced and spend most of their

time performing a series of tasks peculiar to Steam Plant operations (note Duties K, P and Q in Table 3). These individuals perform the second highest average number of tasks (251) of all groups identified. Distinct tasks performed include:

blow down steam heating system boilers or water columns
check central steam plant boiler water levels
inspect steam heating system boiler feed and condensate pumps
blow down central steam plant boiler or water columns
thread pipe by machine
inspect central steam plant boilers
inspect steam heating boiler safety valves
inspect steam traps
test pH of condensate returns
draw boil

Personnel in this job are somewhat more experienced than those found in the first three jobs discussed. Their average time in service is 97 months (versus 69, 49, and 78 months respectfully). Eighty-eight percent hold either a 5- or 7-skill level, while 52 percent of these airmen supervise junior personnel. Only 24 percent are in their first enlistment. Ninety-eight percent of these members are assigned within the CONUS.

V. QUALITY ASSURANCE JOB (ST295). The six members of this job are distinguished from the previously described jobs due to their performance of tasks pertaining to Air Force quality control programs and inspections. While 53 percent of their job time is spent in Duty G, Maintaining HVAC/R Systems, 12 percent of their job time is spent in Duty C (Inspecting and Evaluating) (see Table 3). Airmen in this job report having job titles such as Contract Monitor (50 percent) or Quality Assurance Monitor (33 percent). They perform an average of only 70 tasks (fourth smallest average of all the groups identified) which relate to inspection and evaluating functions. Commonly performed tasks include:

inspect electrical power supplies, other than controls
inspect steam heating system expansion joints
inspect air filtering systems
inspect water pumps
inspect centrifugal water pump operations
inspect air filtering systems
inspect HVAC/R repair operations
evaluate maintenance reports or procedures
examine mechanical operations of dampers

evaluate completed work or work-in-progress
evaluate or review RWPs or PMIs programs
examine mechanical operations of water values

Eighty-three percent hold a 7-skill level, with E-7 being the predominant paygrade. None are in their first enlistment. Sixty-seven percent of these members are serving overseas. The average time in service is 12 years.

VI. MOBILITY JOB (ST052). Compromising 3 percent of the survey sample, these 31 airmen are performing a series of tasks peculiar to mobility (note Duty S in Table 3). Additionally, these airmen perform very little maintenance on HVAC/R systems. Members perform an average of 56 tasks, which include:

erect tents
fire weapons for qualification
don or doff chemical warfare personal protective clothing
practice personal hygiene techniques
tear down, inspect, clean and reassemble weapons
pack personal clothing for deployment
erect camouflage netting
assemble AM-2 matting for rapid runway repair
practice self-protection from extreme weather
operate portable radios

Forty-eight percent of these members hold a 7-skill level, while 49 percent hold a 3- or 5-skill level. The average time in the career field is 10 years. The paygrades range from E-5 to E-7, with E-7 being the predominant paygrade. Furthermore, 81 percent of these members report they are assigned to units within the United States.

VII. SUPERVISOR JOB (ST069). The 114 members of this job are responsible for most of the work area or work center supervision tasks. These individuals are essentially shop or zone foremen, section chiefs, or work center supervisors. Sixty-six percent of their job time is spent organizing and planning, directing and implementing, and inspecting and evaluating (see Table 3, Duties A, B, and C). They perform an average of 91 tasks. Distinctive tasks performed include:

participate in meetings
write EPRs
inspect personnel for compliance with military standards

counsel personnel on personal or military-related matters
determine work priorities
conduct performance feedback worksheet (PFW) evaluation sessions
write recommendations for awards or decorations
supervise civilians
inspect shop facilities or equipment
evaluate individuals for promotion, demotion, reclassification, or special awards

Seventy-eight percent of the members in this specialty job hold a 7-skill level. The predominant paygrade is E-7. Total time in service is 14 years, with 84 percent supervising other subordinates.

VIII. FUNCTIONAL MANAGER JOB (ST132). The six members in this job (1 percent of the total sample) are distinguished from the other jobs because of their performance of tasks peculiar to management activities and planning concerning the AFSC 3E1X1 career ladder. Seventy-six percent of their job time is spent on supervisory and management activities (see Table 3, Duties A, B, and C). These managers perform an average of 42 tasks (the smallest number of tasks performed by any job in this career ladder). Representative tasks performed by members of this job include:

compile information for reports or staff studies
plan or prepare briefings
write special reports, surveys, or staff studies, other than training reports
draft budget of financial requirements
draft agenda for staff meetings, briefings, conferences, or workshops
conduct facilities surveys
evaluate budget or financial requirements
review drafts of regulations, manuals, or other directives
draft proposals for improvement of maintenance procedures

Within this specialty job, 67 percent of these members maintain a 7-skill level, while 33 percent of these members hold a 9-skill level. Only 34 percent are supervising other individuals. Predominant paygrade is E-7.

ANALYSIS OF DAFSC GROUPS

An analysis of DAFSC groups, in conjunction with the analysis of the career ladder structure, is an important part of each occupational survey. The DAFSC analysis identifies differences in tasks performed at the various skill levels. This information may then be used to evaluate how well career ladder documents, such as the AFMAN 36-2108 *Specialty Description* and the Career Field Education and Training Plan, reflect what career ladder personnel are actually doing in the field.

The distribution of skill-level groups across the career ladder jobs is displayed in Table 5, while Table 6 offers another perspective by displaying the relative percent time spent on each duty across the skill-level groups. A typical pattern of progression is noted within the AFSC 3E1X1 career ladder. Personnel at the 3- and 5-skill levels work in the technical jobs of the career ladder and spend most of their time on technical tasks involving the maintenance of HVAC/R systems. As incumbents move up to the 7-skill level, higher percentages work in the supervisory jobs, but many personnel still spend some time maintaining HVAC/R systems. At the 9-skill level, individuals have moved away from the technical job completely and are performing a supervisory and management job.

Skill-Level Descriptions

DAFSC 3E131. Representing 25 percent of the survey sample, these 226 airmen perform an average of 233 tasks. Sixty-nine percent of these airmen work in the General HVAC/R Technician Cluster (see Table 5). Additionally, 23 percent of these members are working as Entry-Level HVAC/R personnel.

Representative tasks performed by 3-skill level incumbents are listed in Table 7. Most tasks are general repair tasks and relate to Duty F (Performing General Heating, Ventilating, Air Conditioning and Refrigeration Activities) and Duty G (Maintaining HVAC/R Systems).

DAFSC 3E151. Representing 39 percent of the survey sample (largest DAFSC group of the survey), these airmen perform an average of 268 tasks (somewhat higher than 3-skill level members). Seventy-three percent work in the General HVAC/R Technician Cluster. Smaller percentages of 5-skill level members are found in the Entry-Level Job (12 percent), Steam Plant Job (8 percent), Mobility Job (3 percent), and the Supervisor Job (4 percent) (see Table 5).

Table 8 lists representative tasks performed by all 5-skill level personnel. Table 9 reflects those tasks which best differentiate 5-skill level personnel from their 3-skill level counterparts. All tasks in the table show a negative value, indicating that 5-skill level personnel are also performing essentially the same technical tasks performed at the 3-skill level. The major difference between the two groups is that 5-skill level personnel perform a broader range of tasks, many being supervisory or training tasks.

TABLE 5

DISTRIBUTION OF DAFSC GROUP MEMBERS ACROSS SPECIALTY JOBS
(PERCENT RESPONDING)

SPECIALTY JOBS	DAFSC 3E131 (N = 226)	DAFSC 3E151 (N = 354)	DAFSC 3E171 (N = 175)	DAFSC 3E191 (N = 15)
I. Entry-Level Job	23	12	2	*
II. General HVAC/R Technician Cluster	69	73	30	*
III. Steam and Hot Water Job	1	*	1	*
IV. Steam Plant Job	4	8	3	*
V. Quality Assurance Job	*	*	3	*
VI. Mobility Job	2	3	9	13
VII. Supervisor Job	1	4	51	74
VIII. Functional Manager Job	*	*	1	13
Not Grouped	*	*	*	*

* Less than 1 percent

TABLE 6

RELATIVE PERCENT TIME SPENT ON DUTIES BY DAFSC GROUPS

DUTIES		DAFSC 3E131 (N=278)	DAFSC 3E151 (N=418)	DAFSC 3E171 (N=203)	DAFSC 3E191 (N=18)
A	ORGANIZING AND PLANNING	1	3	14	22
B	DIRECTING AND IMPLEMENTING	1	3	14	19
C	INSPECTING AND EVALUATING	*	3	16	31
D	TRAINING	*	2	6	5
E	PERFORMING ADMINISTRATIVE AND MAINTENANCE MANAGEMENT ACTIVITIES	1	2	4	7
F	PERFORMING GENERAL HEATING, VENTILATING, AIR-CONDITIONING AND REFRIGERATION ACTIVITIES	14	10	4	*
G	MAINTAINING HVAC/R SYSTEMS	29	24	10	1
H	MAINTAINING HVAC/R ELECTRICAL COMPONENTS AND CIRCUITRY	13	13	5	1
I	MAINTAINING HVAC/R CONTROLS	6	6	4	1
J	MAINTAINING HVAC/R FUEL SYSTEMS AND BURNERS	3	2	1	*
K	MAINTAINING STEAM AND HOT WATER GENERATING EQUIPMENT	4	4	1	*
L	MAINTAINING AIR CONDITIONING AND REFRIGERATION SYSTEMS	10	9	3	1
M	MAINTAINING AIR COMPRESSING EQUIPMENT	4	4	2	*
N	MAINTAINING WARM AIR HEATING, RADIANT HEATING, AND KITCHEN EQUIPMENT	2	2	1	*
O	MAINTAINING ALTERNATE HEATING EQUIPMENT	*	*	*	-
P	PERFORMING INDUSTRIAL WATER CORROSION AND TREATMENT ACTIVITIES	2	2	1	*
Q	MAINTAINING CENTRAL STEAM PLANTS	1	1	1	*
R	PERFORMING ENVIRONMENTAL PROTECTION ACTIVITIES	1	1	1	*
S	PERFORMING PRIME BEEF, CONTINGENCY, OR TACTICAL TEAM ACTIVITIES	8	9	12	12

* Denotes less than .5 percent

TABLE 7

REPRESENTATIVE TASKS PERFORMED BY 3E131 PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N=278)
F196	MEASURE AND CUT COPPER TUBING	85
S1173	ERECT TENTS	85
F174	BEND COPPER TUBING	85
F180	FLARE COPPER TUBING	85
F208	REMOVE OR REPLACE THREE-PHASE ELECTRIC MOTORS	84
F175	BRAZE, WELD, OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING	82
F212	THREAD PIPE BY MACHINE	80
F197	MEASURE AND CUT PIPE BY HAND	79
G248	CLEAN AIR FILTERS	78
F198	MEASURE AND CUT PIPE BY MACHINE	77
F177	CLEAN DRAINS ON HVAC/R EQUIPMENT	76
F178	CLEAN STRAINERS	76
F205	REMOVE OR REPLACE PIPING OR TUBING, SUCH AS WATER, REFRIGERANT, OR FUEL LINES	75
F187	INSTALL CHECK VALUES	75
G360	REMOVE OR REPLACE BELTS OR BELT GUARDS	74
S1174	FIRE WEAPONS FOR QUALIFICATION, SUCH AS M-16 RIFLES OR .38-CALIBER PISTOLS	73
F204	REMOVE OR REPLACE GAUGES	72
G291	INSTALL AIR FILTERS	71
F173	ASSEMBLE HIGH OR LOW PRESSURE FITTINGS	71
G219	ADJUST DRIVE BELT TENSION	70
H435	INSPECT FUSES OR CIRCUIT BREAKERS	70
G273	INSPECT DRIVE BELTS	69
H510	REMOVE OR REPLACE FUSES	69
F182	INSPECT GAUGES OR LINES	68
G249	CLEAN AIR HANDLERS	67
H513	RESET CIRCUIT BREAKERS	67
G289	INSPECT WATER PUMPS	63
G357	REMOVE OR REPLACE AIR FILTERS, OTHER THAN ON AIR COMPRESSORS AND VACUUM SYSTEMS	62
G342	PERFORM RWP INSPECTIONS OR PMIs ON HVAC/R SYSTEMS	54
S1226	PRACTICE PERSONAL HYGIENE TECHNIQUES	45

* Average Number of Tasks Performed - 233

TABLE 8

REPRESENTATIVE TASKS PERFORMED BY 3E151 PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N=418)
S1174	FIRE WEAPONS FOR QUALIFICATION, SUCH AS M-16 RIFLES OR .38 CALIBER PISTOLS	74
S1226	PRACTICE PERSONAL HYGIENE TECHNIQUES	51
G248	CLEAN AIR FILTERS	71
B38	BRIEF CUSTOMERS ON EQUIPMENT DISCREPANCIES OR REPAIRS	61
S1170	DON OR DOFF CHEMICAL WARFARE PERSONAL PROTECTIVE CLOTHING	65
G291	INSTALL AIR FILTERS	70
S1173	ERECT TENTS	66
F208	REMOVE OR REPLACE THREE-PHASE ELECTRIC MOTORS	81
F196	MEASURE AND CUT COPPER TUBING	82
F175	BRAZE, WELD, OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING	78
H510	REMOVE OR REPLACE FUSES	77
F182	INSPECT GAUGES OR LINES	73
F180	FLARE COPPER TUBING	81
F174	BEND COPPER TUBING	79
S1204	PACK PERSONAL CLOTHING AND EQUIPMENT FOR DEPLOYMENT	51
H513	RESET CIRCUIT BREAKERS	72
S1230	TEAR DOWN, INSPECT, CLEAN, AND REASSEMBLE WEAPONS, SUCH AS M-16 RIFLES OR .38 CALIBER PISTOLS	61
G342	PERFORM RWP INSPECTIONS OR PMIs ON HVAC/R SYSTEMS	56
G280	INSPECT MOTOR OR FAN BEARINGS	69
C106	WRITE EPRs	50
F212	THREAD PIPE BY MACHINE	71
G360	REMOVE OR REPLACE BELTS OR BELT GUARDS	69
F205	REMOVE OR REPLACE PIPING OR TUBING, SUCH AS WATER, REFRIGERANT, OR FUEL LINES	75
H524	TROUBLESHOOT ELECTRICAL CIRCUITS	70
G273	INSPECT DRIVE BELTS	66
G265	INSPECT AIR HANDLER FANS	66
F173	ASSEMBLE HIGH- OR LOW-PRESSURE FITTINGS	70
F178	CLEAN STRAINERS	72
F177	CLEAN DRAINS ON HVAC/R EQUIPMENT	71
F197	MEASURE AND CUT PIPE BY HAND	72
F198	MEASURE AND CUT PIPE BY MACHINE	67

* Average Number of Tasks Performed - 268

TABLE 9

TASKS WHICH BEST DIFFERENTIATE BETWEEN
DAFSCs 3E131 AND 3E151 PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS		DAFSC 3E131 (N=278)	DAFSC 3E151 (N=418)	DIFF
C106	WRITE EPRs	3	50	-47
B66	SUPERVISE HVAC/R APPRENTICES (AFSC 3E131)	6	52	-47
D113	CONDUCT OJT	10	54	-43
B42	COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED MATTERS	4	43	-39
C75	CONDUCT PERFORMANCE FEEDBACK WORKSHEET (PFW) EVALUATION SESSIONS	3	41	-38
C101	INSPECT PERSONNEL FOR COMPLIANCE WITH MILITARY STANDARDS	5	40	-35
C99	INSPECT CONDITION OF HANDTOOLS OR SAFETY EQUIPMENT	13	44	-30
D115	COUNSEL TRAINEES ON TRAINING PROGRESS	3	32	-30
D126	EVALUATE PROGRESS OF TRAINEES	2	32	-29
C107	WRITE RECOMMENDATIONS FOR AWARDS OR DECORATIONS	3	32	-29
B67	SUPERVISE HVAC/R JOURNEYMEN (3E151)	3	30	-28
A23	ESTABLISH PERFORMANCE STANDARDS FOR SUBORDINATES	5	30	-25
C86	EVALUATE PERSONNEL FOR COMPLIANCE WITH PERFORMANCE STANDARDS	3	28	-25
D131	MAINTAIN TRAINING RECORDS, CHARTS, OR GRAPHS	2	26	-24
C78	EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, RECLASSIFICATION, OR SPECIAL AWARDS	2	26	-23
C100	INSPECT HVAC/R REPAIR OPERATIONS	13	35	-23
B41	CONDUCT SUPERVISORY ORIENTATIONS OF NEWLY ASSIGNED PERSONNEL	3	26	-23
A31	PLAN OR SCHEDULE WORK ASSIGNMENTS	7	29	-23
D136	VERIFY CDC COURSE COMPLETIONS	3	25	-22
C102	INSPECT SHOP FACILITIES OR EQUIPMENT	11	33	-22
B61	INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	5	26	-21
S1222	PRACTICE COMMUNICATIONS SECURITY OR OPERATIONS SECURITY DURING CONTINGENCY EXERCISES OR OPERATIONS	16	37	-37
A10	DETERMINE WORK PRIORITIES	21	42	-21
C81	EVALUATE JOB HAZARDS OR COMPLIANCE WITH AIR FORCE OCCUPATIONAL SAFETY AND HEALTH PROGRAM	6	27	-21
A4	COORDINATE MAINTENANCE PROBLEMS WITH APPROPRIATE OFFICES OR ORGANIZATIONS	15	35	-20

DAFSC 3E171. Seven-skill level personnel represent 19 percent of the survey sample. Unlike their junior counterparts at the 3- and 5-skill levels, a little over half (51 percent) of these personnel are working in the Supervisor Job. However, 30 percent of the 7-skill level personnel are still working in the General HVAC/R Technician Cluster (see Table 5).

Table 10 lists the most time consuming tasks performed by these airmen. Most of these involve supervisory functions. Table 11 shows those tasks which best differentiate the 5- and 7-skill levels. As expected, the key difference is a much greater emphasis on supervisory functions at the 7-skill level.

DAFSC 3E191. Nine-skill level personnel represent 2 percent of the survey sample. They are primarily working in the Supervisor Job (74 percent), although smaller percentages work in the Mobility (13 percent) and Functional Manager (13 percent) jobs (see Table 5).

Table 12 lists the most time consuming tasks performed by these senior NCOs. Most of these involve supervisory or management functions. Table 13 shows those tasks which best differentiate the 7- and 9-skill levels. As expected, the key difference is a much greater emphasis on management functions at the 9-skill level, while 7-skill level personnel are still performing many of the technical HVAC/R tasks.

Summary

Progression in this career ladder follows a regular pattern of highly technical job focus at the lower skill levels, with a broadening into supervision and management at the 7- and 9-skill levels. An emphasis is clearly seen in performing primarily the core job of HVAC/R system maintenance at the 3- and 5-skill levels, with some broadening into supervisory functions at the 5-skill level. Craftsmen at the 7-skill level are beginning to shift to supervisory jobs, but a good deal of their job time is still spent in the technical arena. The 9-skill level personnel are primarily supervisors and managers of the career ladder. This progression is easily seen in Table 5 and serves the career ladder by providing a regular progression from the 3- to 9-skill level.

TABLE 10

REPRESENTATIVE TASKS PERFORMED BY 3E171 PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N=203)
A27	PARTICIPATE IN GENERAL MEETINGS, SUCH AS STAFF MEETINGS, BRIEFINGS, CONFERENCES, OR WORKSHOPS, OTHER THAN CONDUCTING	74
C106	WRITE EPRs	72
B42	COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED MATTERS	71
A10	DETERMINE WORK PRIORITIES	69
A4	COORDINATE MAINTENANCE PROBLEMS WITH APPROPRIATE OFFICES OR ORGANIZATIONS	69
C101	INSPECT PERSONNEL FOR COMPLIANCE WITH MILITARY STANDARDS	67
C75	CONDUCT PERFORMANCE FEEDBACK WORKSHEET (PFW) EVALUATION SESSIONS	67
S1174	FIRE WEAPONS FOR QUALIFICATION, SUCH AS M-16 RIFLES OR .38-CALIBER PISTOLS	66
C107	WRITE RECOMMENDATIONS FOR AWARDS OR DECORATIONS	64
B38	BRIEF CUSTOMERS ON EQUIPMENT DISCREPANCIES OR REPAIRS	64
S1170	DON OR DOFF CHEMICAL WARFARE PERSONAL PROTECTIVE CLOTHING	61
C102	INSPECT SHOP FACILITIES OR EQUIPMENT	59
C77	EVALUATE COMPLETED WORK OR WORK-IN-PROGRESS	58
A31	PLAN OR SCHEDULE WORK SCHEDULES	58
B67	SUPERVISE HVAC/R JOURNEYMEN (AFSC 3E151)	57
B64	READ OR INTERPRET BLUEPRINTS, DIAGRAMS, DRAWINGS, OR SPECIFICATIONS	57
B41	CONDUCT SUPERVISORY ORIENTATIONS OF NEWLY ASSIGNED PERSONNEL	57
C86	EVALUATE PERSONNEL FOR COMPLIANCE WITH PERFORMANCE STANDARDS	56
A26	ESTABLISH WORK SCHEDULES	55
B61	INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	55
C78	EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, RECLASSIFICATION, OR SPECIAL AWARDS	54
S1173	ERECT TENTS	54
B48	DIRECT UTILIZATION OF PERSONNEL	51
A23	ESTABLISH PERFORMANCE STANDARDS FOR SUBORDINATES	51
A5	DETERMINE COMPLETION TIME ESTIMATES FOR FABRICATIONS OR REPAIRS	51
B65	SUPERVISE CIVILIANS	50
C100	INSPECT HVAC/R REPAIR OPERATIONS	49
A6	DETERMINE COST ESTIMATES FOR FABRICATIONS OR REPAIRS	49
B66	SUPERVISE HVAC/R APPRENTICES (AFSC 3E131)	48
B70	SUPERVISE MILITARY PERSONNEL WITH AFSCs OTHER THAN 3E1X1	47
C89	EVALUATE SAFETY OR SECURITY PROGRAMS	37

* Average Number of Tasks Performed - 161

TABLE 11

TASKS WHICH BEST DIFFERENTIATE BETWEEN
DAFSCs 3E151 AND 3E171 PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS		DAFSC 3E151 (N=320)	DAFSC 3E171 (N=133)	DIFF
F180	FLARE COPPER TUBING	81	31	50
F196	MEASURE AND CUT COPPER TUBING	82	33	49
F208	REMOVE OR REPLACE THREE-PHASE ELECTRIC MOTORS	81	34	48
F178	CLEAN STRAINERS	72	26	47
F177	CLEAN DRAINS ON HVAC/R EQUIPMENT	71	24	47
G360	REMOVE OR REPLACE BELTS OR BELT GUARDS	69	23	46
F175	BRAZE, WELD, OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING	78	32	46
H510	REMOVE OR REPLACE FUSES	77	31	46
F174	BEND COPPER TUBING	79	33	46
F205	REMOVE OR REPLACE PIPING OR TUBING, SUCH AS WATER, REFRIGERANT, OR FUEL LINES	75	30	46
G248	CLEAN AIR FILTERS	71	25	46
G401	SERVICE FANS OR BLOWERS	67	22	45
H512	REMOVE OR REPLACE SINGLE-PHASE ELECTRICAL MOTORS	68	24	45
A35	SCHEDULE PERSONNEL FOR SCHOOLS, TEMPORARY DUTY (TDY) ASSIGNMENTS, OR NONTECHNICAL TRAINING	8	46	-38
A27	PARTICIPATE IN GENERAL MEETINGS, SUCH AS STAFF MEETINGS, BRIEFINGS, CONFERENCES, OR WORKSHOPS, OTHER THAN CONDUCTING	36	74	-38
B68	SUPERVISE HVAC/R CRAFTSMEN (AFSC 3E171)	7	43	-36
C77	EVALUATE COMPLETED WORK OR WORK-IN-PROGRESS	22	58	-36
A2	ASSIGN SPONSORS FOR NEWLY ASSIGNED PERSONNEL	16	51	-35
B70	SUPERVISE MILITARY PERSONNEL WITH AFSCs OTHER THAN 3E1X1	13	47	-34
A4	COORDINATE MAINTENANCE PROBLEMS WITH APPROPRIATE OFFICES OR ORGANIZATIONS	35	69	-34
B65	SUPERVISE CIVILIANS	16	50	-34
B48	DIRECT UTILIZATION OF PERSONNEL	18	51	-33
C107	WRITE RECOMMENDATIONS FOR AWARDS OR DECORATIONS	32	64	-32
A26	ESTABLISH WORK SCHEDULES	23	55	-31
B41	CONDUCT SUPERVISORY ORIENTATIONS OF NEWLY ASSIGNED PERSONNEL	26	57	-30

TABLE 12

REPRESENTATIVE TASKS PERFORMED BY 3E191 PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N= 18)
C77	EVALUATE COMPLETED WORK OR WORK-IN PROGRESS	83
A27	PARTICIPATE IN GENERAL MEETINGS, SUCH AS STAFF MEETINGS, BRIEFINGS, CONFERENCES, OR WORKSHOPS, OTHER THAN CONDUCTING	83
C80	EVALUATE INSPECTION REPORTS OR PROCEDURES	78
C76	EVALUATE BUDGET OR FINANCIAL REQUIREMENTS	78
C101	INSPECT PERSONNEL FOR COMPLIANCE WITH MILITARY STANDARDS	72
B39	COMPILE INFORMATION FOR REPORTS OR STAFF STUDIES	72
B70	SUPERVISE MILITARY PERSONNEL WITH AFSCs OTHER THAN 3E1X1	72
B40	CONDUCT GENERAL STAFF MEETINGS, BRIEFINGS, CONFERENCES, OR WORKSHOPS	72
A16	DRAFT BUDGET OR FINANCIAL REQUIREMENTS	72
A22	ESTABLISH ORGANIZATIONAL POLICIES, SUCH AS OPERATING INSTRUCTIONS (OIs) OR STANDARD OPERATING PROCEDURES (SOPs)	72
C108	WRITE SPECIAL REPORTS, SURVEYS, OR STAFF STUDIES, OTHER THAN TRAINING REPORTS	67
A34	REVIEW DRAFT REGULATIONS, MANUALS, OR OTHER DIRECTIVES	67
C75	CONDUCT PERFORMANCE FEEDBACK WORKSHEET (PFW) EVALUATION SESSIONS	67
C98	INDORSE ENLISTED PERFORMANCE REPORTS (EPRs)	67
C106	WRITE EPRs	67
C78	EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, RECLASSIFICATION, OR SPECIAL AWARDS	67
B65	SUPERVISE CIVILIANS	67
C107	WRITE RECOMMENDATIONS FOR AWARDS AND DECORATIONS	67
A30	PLAN OR PREPARE BRIEFINGS	61
C81	EVALUATE JOB HAZARDS OR COMPLIANCE WITH AIR FORCE OCCUPATIONAL SAFETY AND HEALTH (AFOSH) PROGRAM	61
C83	EVALUATE MAINTENANCE OR UTILIZATION OF EQUIPMENT, SUPPLIES, OR WORKSPACE	56
C93	EVALUATE UNIT EMERGENCY OPERATIONS PLANS	44
C90	EVALUATE SELF-INSPECTION PROGRAMS	39
S1184	MONITOR OPERATIONS OF MOBILE EQUIPMENT, SUCH AS GENERATORS OR HVAC/R EQUIPMENT	22

* Average Number of Tasks Performed - 113

TABLE 13

TASKS WHICH BEST DIFFERENTIATE BETWEEN
DAFSCs 3E171 AND 3E191 PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS		DAFSC 3E171 (N= 203)	DAFSC 3E191 (N= 18)	DIFF
D113	CONDUCT OJT	51	22	29
S1204	PACK PERSONAL CLOTHING AND EQUIPMENT FOR DEPLOYMENT	39	11	28
G265	INSPECT AIR HANDLER FANS	34	6	28
F208	REMOVE OR REPLACE THREE-PHASE ELECTRIC MOTORS	34	6	28
F174	BEND COPPER TUBING	33	6	27
F196	MEASURE AND CUT COPPER TUBING	33	6	27
A26	ESTABLISH WORK SCHEDULES	55	28	27
S1174	FIRE WEAPONS FOR QUALIFICATIONS, SUCH AS M-16 RIFLES OR .38 CALIBER PISTOLS	66	39	27
H513	RESET CIRCUIT BREAKERS	32	6	26
F175	BRAZE, WELD, OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING OR PIPING	32	6	26
C76	EVALUATE BUDGET OR FINANCIAL REQUIREMENTS	21	78	-57
C80	EVALUATE INSPECTION REPORTS OR PROCEDURES	30	78	-48
B40	CONDUCT GENERAL STAFF MEETINGS, BRIEFINGS, CONFERENCES, OR WORKSHOP	25	72	-47
A16	DRAFT BUDGET OR FINANCIAL REQUIREMENTS	29	72	-43
C108	WRITE SPECIAL REPORTS, SURVEYS, OR STAFF STUDIES, OTHER THAN TRAINING REPORTS	25	67	-42
A34	REVIEW DRAFTS OF REGULATIONS, MANUALS, OR OTHER DIRECTIVES	28	67	-39
B39	COMPILE INFORMATION FOR REPORTS OR STAFF STUDIES	35	72	-37
C97	INDORSE CIVILIAN PERFORMANCE RATINGS OR SUPERVISORY APPRAISALS	19	56	-36

ANALYSIS OF AFMAN 36-2108 *SPECIALTY DESCRIPTION*

Survey data were compared to the AFMAN 36-2108 *Specialty Description* for Heating, Ventilation, Air Conditioning and Refrigeration Systems, dated 31 October 1994. The overall specialty description for the 3-, 5-, 7- and 9-skill levels accurately describes the technical and supervisory nature of jobs at the various skill levels. The description also reflects the primary tasks and responsibilities discussed in the **SPECIALTY JOBS** section of this report. The specialty description should be carefully reviewed against the job structure described in the **SPECIALTY JOBS** section of this OSR to ensure all technical and support functions are adequately covered.

TRAINING ANALYSIS

Occupational survey data are one of many sources of information which can be used to assist in the development of a training program relevant to the needs of personnel in their first enlistment. Factors which may be used in evaluating training include the overall description of the job being performed by first-enlistment personnel and their overall distribution across career ladder jobs, percentages of first-job (1-24 months TAFMS) or first-enlistment (1-48 months TAFMS) members performing specific tasks, as well as TE and TD ratings (previously explained in the **SURVEY METHODOLOGY** section).

First-Enlistment Personnel

In this study, there are 321 members in their first enlistment (1-48 months TAFMS), representing 35 percent of the total survey sample. Most of their duty time is spent on technical activities involving the maintenance of HVAC/R systems and equipment. Table 14 displays the relative percent of time spent on duties by first-enlistment personnel. Reviewing the table, it is clearly evident that most first-enlistment personnel are primarily performing tasks under Duty G (Maintaining HVAC/R Systems), Duty H (Maintaining HVAC/R Electrical Components And Circuitry), and Duty F (Performing General Heating, Ventilating, Air Conditioning and Refrigeration Activities). Not surprisingly, 56 percent work in the General HVAC/R Technician Cluster (see Figure 2).

Table 15 lists representative tasks performed by first-enlistment personnel. Most involve general tasks, such as flare copper tubing, remove or replace three-phase electric motors, and bend copper tubing.

Table 16 lists all of the systems or equipment maintained by 30 percent or more of first-enlistment airmen. Most commonly maintained equipment include air handlers, pumps, air compressors, gas-fired equipment, and central air conditioners.

TABLE 14

RELATIVE PERCENT TIME SPENT ON DUTIES BY FIRST-ENLISTMENT PERSONNEL
(N=321)

	DUTIES	PERCENT TIME SPENT
A	ORGANIZING AND PLANNING	1
B	DIRECTING AND IMPLEMENTING	1
C	INSPECTING AND EVALUATING	1
D	TRAINING	*
E	PERFORMING ADMINISTRATIVE AND MAINTENANCE MANAGEMENT ACTIVITIES	1
F	PERFORMING GENERAL HEATING, VENTILATING, AIR CONDITIONING AND REFRIGERATION ACTIVITIES	14
G	MAINTAINING HVAC/R SYSTEMS	29
H	MAINTAINING HVAC/R ELECTRICAL COMPONENTS AND CIRCUITRY	13
I	MAINTAINING HVAC/R CONTROLS	6
J	MAINTAINING HVAC/R FUEL SYSTEMS AND BURNERS	2
K	MAINTAINING STEAM AND HOT WATER GENERATING EQUIPMENT	4
L	MAINTAINING AIR CONDITIONING AND REFRIGERATION SYSTEMS	9
M	MAINTAINING AIR COMPRESSING EQUIPMENT	4
N	MAINTAINING WARM AIR HEATING, RADIANT HEATING, AND KITCHEN EQUIPMENT	2
O	MAINTAINING ALTERNATE HEATING EQUIPMENT	*
P	PERFORMING INDUSTRIAL WATER CORROSION AND TREATMENT ACTIVITIES	2
Q	MAINTAINING CENTRAL STEAM PLANTS	1
R	PERFORMING ENVIRONMENTAL PROTECTION ACTIVITIES	1
S	PERFORMING PRIME BEEF, CONTINGENCY, OR TACTICAL TEAM ACTIVITIES	9

* Denotes less than .5 percent

TABLE 15

REPRESENTATIVE TASKS PERFORMED BY AFSC 3E1X1
FIRST-ENLISTMENT PERSONNEL
(N=321)

TASKS		PERCENT MEMBERS PERFORMING
F180	FLARE COPPER TUBING	86
F208	REMOVE OR REPLACE THREE-PHASE ELECTRIC MOTORS	85
F196	MEASURE AND CUT COPPER TUBING	85
F174	BEND COPPER TUBING	84
F175	BRAZE, WELD, OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING OR PIPING	82
G248	CLEAN AIR FILTERS	79
F212	THREAD PIPE BY MACHINE	79
F197	MEASURE AND CUT PIPE BY HAND	79
F205	REMOVE OR REPLACE PIPING OR TUBING, SUCH AS WATER, REFRIGERANT, OR FUEL LINES	77
F177	CLEAN DRAINS ON HVAC/R EQUIPMENT	77
F178	CLEAN STRAINERS	77
F198	MEASURE AND CUT PIPE BY MACHINE	76
S1174	FIRE WEAPONS FOR QUALIFICATION, SUCH AS M-16 RIFLES OR .38-CALIBER PISTOLS	74
G360	REMOVE OR REPLACE BELTS OR BELT GUARDS	74
F204	REMOVE OR REPLACE GAUGES	74
H510	REMOVE OR REPLACE FUSES	71
F173	ASSEMBLE HIGH- OR LOW-PRESSURE FITTINGS	71
H435	INSPECT FUSES OR CIRCUIT BREAKERS	71
G291	INSTALL AIR FILTERS	70
F182	INSPECT GAUGES OR LINES	70
G219	ADJUST DRIVE BELT TENSION	70
H513	RESET CIRCUIT BREAKERS	69
G273	INSPECT DRIVE BELTS	69
G249	CLEAN AIR HANDLERS	66
S1173	ERECT TENTS	65
G357	REMOVE OR REPLACE AIR FILTERS, OTHER THAN ON AIR COMPRESSORS AND VACUUM SYSTEMS	62
S1226	PRACTICE PERSONAL HYGIENE TECHNIQUES	46

Average Number of Tasks Performed - 237

TABLE 16

SYSTEMS OR EQUIPMENT MAINTAINED BY
30 PERCENT OR MORE FIRST-ENLISTMENT AFSC 3E1X1 PERSONNEL

EQUIPMENT	1ST JOB (N=160)	1ST ENL (N=321)
AIR HANDLERS	78	83
PUMPS	68	75
AIR COMPRESSORS, REAL PROPERTY INSTALLED EQUIPMENT	67	73
GAS-FIRED EQUIPMENT	69	70
CENTRAL AIR CONDITIONERS, 5 TONS AND BELOW	68	68
ICE MACHINES	57	65
HEAT PUMPS	64	64
PACKAGE AIR CONDITIONING OR REFRIGERATION UNITS	60	64
CENTRAL AIR CONDITIONERS, OVER 5 TONS	60	63
LOW-PRESSURE STEAM HEATING SYSTEMS	61	62
FORCED WARM AIR HEATING SYSTEMS	53	60
LOW-TEMPERATURE WATER HEATING SYSTEMS	59	60
COOLING TOWERS	56	59
REFRIGERATED DRINKING FOUNTAINS	51	59
OIL-FIRED EQUIPMENT	54	56
REFRIGERATION SYSTEMS	51	56
COMMERCIAL RECIPROCATING CHILLED WATER SYSTEMS	49	55
HIGH-TEMPERATURE WATER HEATING SYSTEMS	56	54
DOMESTIC WATER HEATERS	46	52
EQUIPMENT-COOLING REFRIGERATION EQUIPMENT	46	52
COMBINATION HEATING AND EVAPORATIVE COOLING UNITS	53	51
SECTIONAL WALK-IN REFRIGERATION EQUIPMENT	41	47
PORTABLE AIR COMPRESSORS	41	46
MEDIUM TEMPERATURE WATER HEATING SYSTEMS	46	44
EVAPORATIVE COOLERS	39	42
HIGH-PRESSURE STEAM HEATING SYSTEMS	47	42
MULTISTAGE AIR COMPRESSORS	33	38
DOMESTIC REFRIGERATORS	28	37
KITCHEN EQUIPMENT, OTHER THAN ELECTRICAL EQUIPMENT	24	34
PORTABLE COOLING UNITS	31	33
HEAT RECLAIM AIR CONDITIONING AND HEATING UNITS	32	31

FIRST-ENLISTMENT PERSONNEL JOBS
(N=96)

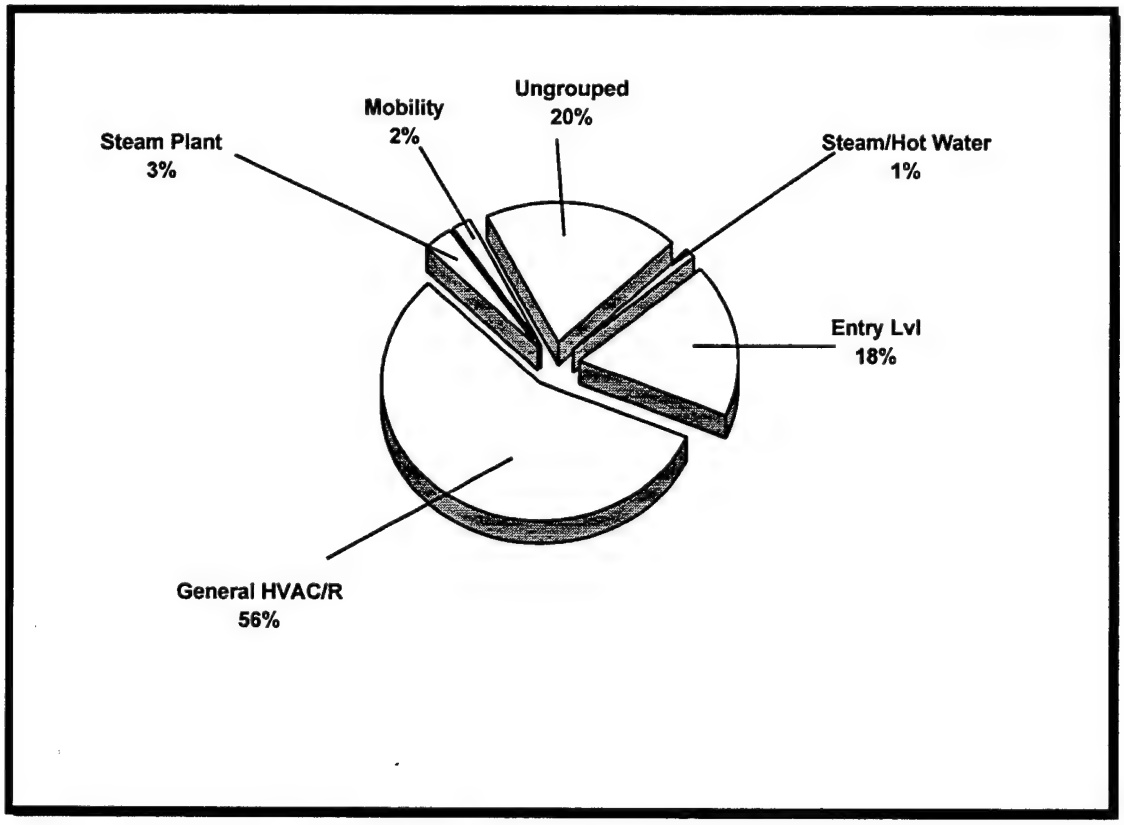

FIGURE 2

Table 17 lists equipment and tools used by 30 percent or more of the first-enlistment personnel. Examples of such tools and equipment are acetylene torch kits, ampmeters, flaring and swaging tool kits, ammeters, multimeters, and crimping tools.

Table 18 lists electronic principals used by 30 percent or more of first-enlistment airmen. The most commonly used electronic principles related to using digital multimeters; troubleshooting circuits containing conductors, fuses, lamps, switches, or batteries; troubleshooting circuits to isolate faulty relays and solenoids; and tracing schematic or block diagrams.

TABLE 17

EQUIPMENT OR TOOLS USED BY
30 PERCENT OR MORE FIRST-ENLISTMENT AFSC 3E1X1 PERSONNEL

EQUIPMENT	1ST JOB (N=160)	1ST ENL (N=321)
ACETYLENE TORCH KITS	84	88
AMPMETERS	83	87
FLARING AND SWAGING TOOL KITS	82	85
PIPE CUTTING AND THREADING EQUIPMENT	83	85
CLAMP-ON AMMETERS	75	84
DIGITAL MULTIMETERS	75	82
MULTIMETERS	74	82
CRIMPING TOOLS	79	81
OHMMETERS	71	81
ELECTRONIC LEAK DETECTORS	74	79
PORTABLE POWER DRILLS	74	79
AMPROBES	65	73
DIGITAL THERMOMETERS	66	71
BEARING PULLERS	61	70
MANIFOLD GAUGE ASSEMBLIES	68	70
PROPANE TORCH KITS	63	69
OXYGEN ACETYLENE WELDING EQUIPMENT	63	67
FREON DETECTORS	59	60
GRINDERS	56	60
DRILL PRESSES	53	57
ANALOG MULTIMETERS	51	55
MERCURY THERMOMETERS	52	51
CALCULATORS	49	48
PIPE BENDING MACHINES	51	47
FLOW HOODS	42	45
GEAR PULLERS	33	45
ELECTRONIC SCALES	33	40
ELECTRONIC THERMOMETERS	38	40
HIGH PRESSURE SPRAY WASHERS	38	40
MANOMETERS	30	35
MOTOR STARTERS	24	34
OIL TEST KITS	28	34
PNEUMATIC CONTROL TEST AND REPAIR KITS	26	31
PORTABLE AMMETERS	28	31
FLUE GAS ANALYZERS	29	30
PITOT TUBES	29	30

TABLE 18

ELECTRONIC PRINCIPALS USED BY
30 PERCENT OR MORE FIRST-ENLISTMENT AFSC 3E1X1 PERSONNEL

EQUIPMENT	1ST JOB (N=160)	1ST ENL (N=321)
USE DIGITAL MULTIMETERS	63	69
TROUBLESHOOT CIRCUITS CONTAINING CONDUCTORS, FUSES, LAMPS, SWITCHES, OR BATTERIES	59	66
USE CRIMPING TOOLS TO REPLACE OR MAKE CONNECTIONS	60	66
TROUBLESHOOT CIRCUITS TO ISOLATE FAULTY RELAYS	56	65
TROUBLESHOOT CIRCUITS TO ISOLATE FAULTY SOLENOIDS	58	64
TRACE SCHEMATIC OR BLOCK DIAGRAMS OF CIRCUITS CONTAINING AC MOTORS	56	59
TROUBLESHOOT CIRCUITS CONTAINING CONDUCTORS, FUSES, LAMPS, SWITCHES, OR BATTERIES	54	59
TRACE SCHEMATIC OR BLOCK DIAGRAMS OF CIRCUITS CONTAINING RELAYS	56	59
TRACE SCHEMATIC OR BLOCK DIAGRAMS OF CIRCUITS CONTAINING SOLENOIDS	53	57
OHM CHECK CAPACITORS	48	56
OHM CHECK TRANSFORMERS	47	53
OHM CHECK RESISTORS	43	50
TRACE SCHEMATIC DIAGRAMS OF POWER SUPPLY CIRCUITS	48	50
TRACE SCHEMATIC OR BLOCK DIAGRAMS OF CIRCUITS CONTAINING TRANSFORMERS	43	47
CONTINUITY CHECK RELAYS	43	46
TRACE SCHEMATIC OR BLOCK DIAGRAMS OF CIRCUITS CONTAINING CAPACITORS	41	45
MEASURE TRANSFORMER OUTPUT VOLTAGE	38	42
TROUBLESHOOT CIRCUITS TO ISOLATE FAULTY RESPONDERS	38	42
TRACE BLOCK DIAGRAMS OF CIRCUITS CONTAINING POWER SUPPLIES	39	41
USE BASIC AC ELECTRICAL/ELECTRONIC TERMS	37	39
TRACE SCHEMATIC OR BLOCK DIAGRAMS OF CIRCUITS CONTAINING RESISTORS	34	36
TRACE SCHEMATIC OR BLOCK DIAGRAM OF CIRCUITS CONTAINING DC METERS	38	33
TRACE SCHEMATIC OR BLOCK DIAGRAMS OF CIRCUITS CONTAINING SOLID-STATE SPECIAL PURPOSE DEVICES	29	32
PERFORM MAINTENANCE ON SOLENOID COMPONENT PARTS	26	31

Finally, Table 19 lists the forms used by 30 percent or more of the first-enlistment personnel. AF Forms 327, 332, and 1880 are the most commonly used forms.

Training Emphasis (TE) and Task Difficulty (TD) Data

TE and TD data are secondary factors that can assist technical school personnel in deciding which tasks should be emphasized in entry-level training. These ratings, based on the judgments of senior career ladder NCOs working at operational units in the field, are collected to provide training personnel with a rank-ordering of those tasks in the JI considered important for first-enlistment personnel training (see Table 20 for the top-rated tasks), along with a measure of the difficulty of the JI tasks (see selected high rated tasks presented in Table 21). When combined with data on the percentages of first-enlistment personnel performing tasks, comparisons can then be made to determine if training adjustments are necessary. For example, tasks receiving high ratings on both task factors, accompanied by moderate to high percentages performing, may warrant resident training. Those tasks receiving high task factor ratings, but low percentages performing, may be more appropriately planned for OJT programs within the career ladder. Low task factor ratings may highlight tasks best omitted from training for first-enlistment personnel, but this decision must be weighed against percentages of personnel performing the tasks, command concerns, and criticality of the tasks.

To assist technical school personnel, AFOMS has developed a computer program that incorporates these secondary factors and the percentage of first-enlistment personnel performing each task to produce an Automated Training Indicator (ATI) for each task. These indicators correspond to training decisions listed and defined in the Training Decision Logic Table found in Attachment 1, AETCR 52-22, and allows course personnel to quickly focus their attention on those tasks which are most likely to qualify for initial resident course consideration.

TABLE 19

FORMS USED BY
30 PERCENT OR MORE FIRST-ENLISTMENT AFSC 3E1X1 PERSONNEL

FORMS	1ST JOB (N=160)	1ST ENL (N=321)
AF FORM 327 (BASE CIVIL ENGINEER WORK ORDER)	34	42
AF FORM 332 (BASE CIVIL ENGINEER WORK REQUEST)	30	35
AF FORM 1880 (OPTIONAL INSPECTION GUIDE & TROUBLE REPORT (GENERAL PURPOSE VEHICLE)	36	38

Table 20 presents tasks with the highest TE ratings for AFSC 3E1X1 first-enlistment airmen, while Table 21 displays those tasks AFSC 3E1X1 raters judged to be most difficult to learn how to do. For example, TE raters (refer to Table 20) reported that tasks such as performing electrical troubleshooting of air conditioning systems and reclaiming system refrigerants using reclaim systems require a lot of training emphasis and, from the data, most airmen in their first job and within their first enlistment are performing these tasks. Table 21 shows TD raters reported isolating malfunctions to printed circuit cards in data gathering panels (DGPs) and isolating malfunctions to circuit boards in DDC systems to be the most difficult tasks to learn. However, due to the low numbers of individuals performing these type of tasks, these tasks would be inappropriate for including in a technical resident curriculum and is more appropriately taught as an OJT item.

Various lists of tasks, accompanied by TE and TD ratings, and where appropriate, ATI information, are contained in the TRAINING EXTRACT package and should be reviewed in detail by technical school personnel. (For a more detailed explanation of TE and TD ratings, see Task Factor Administration in the **SURVEY METHODOLOGY** section of this report.)

TABLE 20

TASKS RATED HIGHEST IN TRAINING EMPHASIS

TASKS		TNG EMP*	PERCENT MEMBERS PERFORMING 1ST JOB (N= 160)	PERCENT MEMBERS PERFORMING 1ST ENL (N = 321)	TASK DIFF*
H74	Perform electrical troubleshooting of air conditioning systems	7.22	54	60	6.50
L849	Reclaim system refrigerants using reclaim systems	7.17	48	56	5.38
H475	Perform electrical troubleshooting of refrigeration systems, other than controls	7.03	43	52	6.53
H473	Perform continuity checks of electrical systems	6.55	34	47	4.50
H524	Troubleshoot electrical circuits	6.48	51	60	6.05
L828	Locate refrigerant leaks using electronic or halide-leak detectors	6.45	46	55	4.32
H470	Measure motor current draws	6.37	43	52	4.11
H472	Measure motor running currents with clamp-on meters	6.30	41	50	3.73
L814	Charge air conditioning or refrigeration systems with refrigerant, other than absorption or centrifugal systems	6.28	42	52	5.32
H478	Perform operational tests on three-phase motors	6.28	46	52	4.75
H526	Troubleshoot electrical motors	6.27	54	60	5.52
H477	Perform operational tests on single-phase motors	6.25	44	52	4.77
L829	Locate refrigerant leaks using soap solutions	6.22	58	62	3.79
F175	Braze, weld, or silver solder lines or fittings, such as condensers, receivers, evaporators, tubing, or piping	6.20	78	82	5.00
L876	Remove or replace refrigerant compressors	6.18	39	48	6.18
L850	Recover system refrigerants using other than reclaim systems	6.12	19	21	5.51
F208	Remove or replace three-phase electric motors	6.10	78	85	4.57
L847	Pump down refrigeration or air conditioning systems	6.07	42	49	4.65

* Mean TE Rating is 1.73, and Standard Deviation is 1.48 (High TE = 3.21)

** Average TD Rating is 5.00

TABLE 21

TASKS RATED HIGHEST IN TASK DIFFICULTY

TASKS		TASK DIFF	PERCENT MEMBERS PERFORMING 1ST JOB (N=160)	1ST ENL (N=321)	5-SKL LEVEL (N= 418)	7-SKL LEVEL (N= 203)	TNG EMP
I622	ISOLATE MALFUNCTIONS TO PRINTED CIRCUIT CARDS IN DATA GATHERING PANELS (DGPs)	8.57	4	5	3	3	1.78
I618	ISOLATE MALFUNCTIONS TO CIRCUIT BOARDS IN DDC SYSTEMS	8.50	6	7	5	2	2.18
I627	PATCH SOFTWARE PROGRAMS	8.42	1	3	2	1	.87
I619	ISOLATE MALFUNCTIONS TO DDC SYSTEMS	8.42	7	7	7	4	2.87
I649	PROGRAM SYSTEM SOFTWARE	8.22	3	3	3	2	1.17
I575	EVALUATE DDC SYSTEMS PRIOR TO PURCHASE	8.03	1	2	3	6	.95
I623	LOAD SOFTWARE PROGRAMS TO DDC SYSTEMS	7.94	1	3	4	3	1.45
I688	TROUBLESHOOT ELECTRONIC CONTROL SYSTEMS, OTHER THAN TIMERS	7.92	14	16	16	7	3.82
I687	TROUBLESHOOT ELECTRONIC CIRCUITS	7.85	16	19	18	10	3.97
I651	REBUILD ELECTRONIC CONTROL COMPONENTS	7.81	3	4	3	2	2.10
I628	PERFORM ELECTRONIC TROUBLESHOOTING OF AIR CONDITIONING SYSTEMS	7.67	24	28	22	8	4.03
I625	MODIFY ELECTRICAL OR ELECTRONIC HVAC/R CONTROL SYSTEMS	7.58	8	11	16	10	2.03
I621	ISOLATE MALFUNCTIONS TO EMCS SENSORS	7.54	4	5	6	4	2.87
I629	PERFORM OPERATIONAL TESTS ON DGP COMPONENTS	7.53	3	4	3	4	2.37
I620	ISOLATE MALFUNCTIONS TO ELECTRONIC TEMPERATURE SENSORS	7.52	6	7	7	5	3.10
I582	INSTALL CENTRAL HEATING PLANT CONTROL PANELS	7.47	4	6	7	1	2.08
I616	ISOLATE CENTRAL HEATING PLANT CONTROL PANEL MALFUNCTIONS	7.44	6	8	8	3	3.33

* Average TD Rating is 5.00

Specialty Training Standard (STS)

A comprehensive review of STS 3E1X1, dated 1 Nov 95, compared STS items to survey data (based on the previously mentioned assistance from SMEs in matching JI tasks to STS elements). STS paragraphs containing general knowledge information, mandatory entries, subject-matter-knowledge-only requirements, or basic supervisory responsibilities were not examined. Task knowledge and performance elements of the STS were compared against the standard set forth in AETCR 52-22 and AFI 36-2623 (i.e., include tasks performed or knowledge required by 20 percent or more of the personnel in a skill level (criterion group) of the AFSC).

Overall, the STS provides very comprehensive coverage of the work performed by personnel in this career ladder. Most paragraphs were, in general supported, in that tasks matched to the STS paragraphs generally had at least 20 percent of one criterion group performing the matched tasks. However, several paragraphs need to be carefully reviewed by SMEs for possible fine-tuning of content and proficiency codes.

Table 22 lists several examples of STS paragraphs which need to be reviewed by SMEs because they do not meet the 20 percent performing criteria. These STS elements should be carefully considered regarding whether retention in the STS is warranted.

Tasks not matched to any element of the STS are listed at the end of the STS computer listing. These were reviewed to determine if there were any tasks concentrated around any particular functions or jobs. Those technical tasks performed by 20 percent or more respondents of the STS target groups, but which were not referenced to any STS element, are displayed in Table 23. Training personnel and SMEs should consider these unreferenced tasks to determine if inclusion in the STS is justified.

TABLE 22

EXAMPLES OF STS ELEMENTS NOT SUPPORTED BY SURVEY DATA
(LESS THAN 20 PERCENT MEMBERS PERFORMING)

STS ITEM		PERCENT MEMBERS PERFORMING					
		1ST JOB	1ST ENL	DAFSC 3E151	DAFSC 3E171	TNG EMP	TSK DIFF
0092	8.07. Warranty and Guarantee Program						
E155	Monitor AF Warranty and Guarantee program	1	2	4	8	.78	4.90
0099	8.13.01. Perform Inputs						
E169	Update BEAMS data	1	2	3	2	.30	5.25
E170	Update CAMS data	2	4	2	6	.30	5.73
0103	8.13.05. Perform Automated Data Analysis						
E163	Review BEAMS output	1	2	2	4	.50	5.00
E164	Review CAMS outputs	1	2	4	5	.58	5.46
0162	16.01.02.02. Dual Path						
G296	Install Dual Duct Terminal Devices	9	13	11	4	3.35	5.31
G220	Adjust Dual Duct Terminal Devices	16	17	17	8	3.60	5.28
0179	16.04.01.02. Duct System Terminal Units						
G296	Install Dual Duct Terminal Devices	9	13	11	4	3.35	5.31
G220	Adjust Dual Duct Terminal Devices	13	13	11	6	3.60	5.28

Mean TE rating is 3.25, and the Standard Deviation is 1.48 (High TE = 4.73)

TABLE 23

EXAMPLES OF TECHNICAL TASKS PERFORMED BY 20 PERCENT OR MORE GROUP MEMBERS AND NOT REFERENCED TO THE STS

TASKS		PERCENT MEMBERS PERFORMING 1ST JOB	1ST ENL	DAFSC 3E151	DAFSC 3E171	TNG EMP	TSK DIF
S1173	Erect tents	53	65	66	54	3.67	4.20
F172	Anneal copper tubing or gaskets	49	52	37	16	3.73	3.92
G302	Install gauges	59	64	65	21	4.45	3.25
G292	Install boiler safety values	36	43	43	17	4.97	4.08
G303	Install heat exchangers	23	28	25	9	4.25	4.87
G305	Install heating blowers	29	38	37	15	4.37	4.68
G318	Install steam heating system values or fittings	31	36	38	17	4.90	4.37
G407	Shut down HVAC/R systems for civil engineering (CE) or contractor maintenance	41	50	50	18	4.98	3.60
S1167	Assemble AM-2 matting for rapid-runway repair	34	50	59	43	3.45	5.16
F191	Install insulating materials on ducts, other than performed insulation	38	41	40	17	4.43	4.13
G316	Install safety valves, other than boiler safety values	28	33	36	11	4.62	4.34
G317	Install solenoid values	49	57	61	23	4.70	4.15
G370	Install unit heaters	33	40	39	15	4.37	4.61
G323	Install water regulating values	27	34	33	13	4.65	4.12
H467	Install transformer	37	44	51	17	4.92	4.85
L825	Install ice machines	19	31	36	15	4.02	5.21
S1170	Don or doff chemical warfare personal protective clothing	44	53	65	61	4.05	4.07
S1172	Erect camouflage netting	29	40	55	40	3.58	4.41
S1175	Identify and report chemical warfare agents	28	36	47	43	3.78	4.42
S1225	Practice expedient methods	17	24	35	37	3.20	4.42
A3	Coordinate calibrations of special tools with precision measurement equipment laboratory (PMEL)	6	9	17	27	.70	3.32

JOB SATISFACTION ANALYSIS

An examination of the job satisfaction indicators of various groups can give career ladder managers a better understanding of some of the factors which may affect the job performance of airmen in the career ladder. Attitude questions covering job interest, perceived utilization of talents and training, sense of accomplishment from work, and reenlistment intentions were included in the survey booklet to provide indications of job satisfaction.

Table 24 presents job satisfaction data for AFSC 3E1X1 TAFMS groups, together with TAFMS data for a comparative sample of Support career ladders surveyed in 1994. Overall, the majority of the AFSC 3E1X1 survey sample express positive feelings toward their jobs and display higher percentages than the comparative sample groups.

An indication of how job satisfaction perceptions have changed over time is provided in Table 25, where again TAFMS data for 1996 survey respondents are presented, along with data from respondents to the last OSRs. Reviewing this table, it is evident the merger of AFSCs 545X0, 545X2, and 545X3 in October 1992 did have an impact across TAFMS groups relating to job satisfaction. It is apparent moreso in the review of the individuals in their first- and second-enlistment. These incumbents express higher job interest, and feel their talents and training are being used more effectively than was expressed by respondents in the last OSRs.

In Table 26, review of the job satisfaction data for personnel in the specialty jobs identified in this survey reveals that airmen responded very positively to all the indicators listed, except for Steam and Hot Water Job incumbents who expressed low job interest (only 40 percent found their job interesting). Looking at the Mobility Job, the Steam and Hot Water Job and the Functional Manager Job, these airmen are far less satisfied with their jobs, with higher percentages stating the job is dull and does not utilize their talents or training. Mobility personnel reenlistment intentions are the lowest of all the specialty jobs with the exception of the Functional Manager Job, who is reporting the lowest percentage in their intent to reenlist.

When there are serious problems in a career ladder, survey respondents are usually quite free with write-in comments to complain about perceived problems in the field. Sixteen percent of this survey sample used the write-in feature to convey some type of information. No particular trends were noted among the comments received.

TABLE 24

COMPARISON OF JOB SATISFACTION INDICATORS BY TAFMS GROUPS
(PERCENT MEMBERS RESPONDING)

	1-48 MOS TAFMS		49-96 MOS TAFMS		97+ MOS TAFMS	
	1996 3E1X1 (N=321)	COMP SAMPLE* (N=12,756)	1996 3E1X1 (N=321)	COMP SAMPLE* (N=12,756)	1996 3E1X1 (N=321)	COMP SAMPLE* (N=12,756)
EXPRESSED JOB INTEREST:						
INTERESTING	82	60	85	67	80	69
SO-SO	12	18	9	20	13	15
DULL	7	13	7	13	7	10
PERCEIVED UTILIZATION OF TALENTS:						
FAIRLY WELL TO PERFECTLY	84	75	87	76	83	81
LITTLE OR NOT AT ALL	16	25	13	24	17	19
PERCEIVED UTILIZATION OF TRAINING:						
FAIRLY WELL TO PERFECTLY	87	89	82	78	74	78
LITTLE OR NOT AT ALL	13	11	18	22	26	22
SENSE OF ACCOMPLISHMENT GAINED FROM WORK:						
SATISFIED	74	67	74	69	72	65
NEUTRAL	15	15	11	12	9	11
DISSATISFIED	11	17	15	19	19	19
REENLISTMENT INTENTIONS:						
YES, OR PROBABLY YES	56	59	83	73	70	70
NO, OR PROBABLY NO	43	40	15	27	12	11
PLAN TO RETIRE	1	1	2	*	18	19

* Denotes less than 1 percent

** Comparative sample of support career ladders surveyed in 1994 (includes AFSC 3A0X1, Information Management, AFSC 3C2X1, Communications-Computer Systems Control, AFSC 3E0X1, Electrical Power Production, AFSC 3E7X1, Fire Protection, AFSC 3E8X1, Explosive Ordnance Disposal, AFSC 3M0X1, Services, AFSC 3R0X1, Printing Management

TABLE 25

COMPARISON OF CURRENT SURVEY AND PRE-MERGER TAFMS GROUPS
(PERCENT MEMBERS RESPONDING)

JOB SATISFACTION INFORMATION	1-48 MOS TAFMS				49-96 MOS TAFMS				97+ MOS TAFMS			
	1996 3E1X1 (N=321)	1992 545X0 (N=522)	1985 545X2 (N=491)	1988 545X3 (N=157)	1996 3E1X1 (N=138)	1992 545X0 (N=266)	1985 545X2 (N=245)	1988 545X3 (N=65)	1996 3E1X1 (N=457)	1992 545X0 (N=345)	1985 545X2 (N=324)	1988 545X3 (N=82)
EXPRESSED JOB INTEREST:												
INTERESTING	82	79	76	73	85	76	70	75	80	78	76	83
SO-SO	12	10	14	14	9	12	19	12	13	12	12	11
DULL	7	9	9	12	7	9	9	13	7	8	11	4
PERCEIVED UTILIZATION OF TALENTS:												
FAIRLY WELL TO PERFECTLY	84	84	79	76	87	80	82	80	83	81	83	88
LITTLE OR NOT AT ALL	16	16	21	24	13	20	18	20	17	19	17	12
PERCEIVED UTILIZATION OF RAINING:												
FAIRLY WELL TO PERFECTLY	87	80	83	84	82	79	81	94	74	77	81	87
LITTLE OR NOT AT ALL	13	20	17	16	18	21	19	6	26	22	19	13
SENSE OF ACCOMPLISHMENT FROM WORK:												
SATISFIED	74	80	72	72	74	75	69	81	72	70	73	70
NEUTRAL	15	7	12	12	11	8	16	6	9	11	9	15
DISSATISFIED	11	13	15	16	15	17	13	13	19	18	18	14
REENLISTMENT INTENTIONS:												
YES, OR PROBABLY YES	56	55	61	41	83	77	77	61	70	77	82	77
NO, OR PROBABLY NO	43	42	35	55	15	21	19	38	12	8	15	9
WILL RETIRE	1	1	4	1	2	1	4	2	18	13	3	15

TABLE 26

COMPARISONS OF JOB SATISFACTION INDICATORS BY SPECIALTY JOBS
(PERCENT MEMBERS RESPONDING)

	HVAC/R ENTRY-LVL (ST094) (N=100)	GENERAL HVAC/R (ST105) (N=473)	STEAM/HOT WATER (ST147) (N=5)	STEAM PLANT (ST183) (N=40)	QUALITY ASSURANCE (ST295) (N=6)
EXPRESSED JOB INTEREST:					
INTERESTING	82	88	40	89	83
SO-SO	12	8	40	10	0
DULL	6	4	20	3	17
PERCEIVED UTILIZATION OF TALENTS:					
FAIRLY WELL TO PERFECTLY	84	91	80	93	83
LITTLE OR NOT AT ALL	16	9	20	7	17
PERCEIVED UTILIZATION OF TRAINING:					
FAIRLY WELL TO PERFECTLY	86	87	80	91	84
LITTLE OR NOT AT ALL	14	13	20	9	16
SENSE OF ACCOMPLISHMENT GAINED FROM WORK:					
SATISFIED	75	79	80	88	83
NEUTRAL	15	8	20	8	0
DISSATISFIED	10	12	0	5	17
REENLISTMENT INTENTIONS:					
YES, OR PROBABLY YES	65	71	60	65	100
NO, OR PROBABLY NO	32	23	40	23	0
WILL RETIRE	3	6	*	12	0

TABLE 26 (CONTINUED)

COMPARISONS OF JOB SATISFACTION INDICATORS BY SPECIALTY JOBS
(PERCENT MEMBERS RESPONDING)

	MOBILITY (ST052) (N=31)	SUPERVISOR (ST069) (N=114)	FUNCTIONAL MANAGER (ST132) (N=6)
EXPRESSED JOB INTEREST:			
INTERESTING	55	82	50
SO-SO	26	13	17
DULL	19	4	33
PERCEIVED UTILIZATION OF TALENTS:			
FAIRLY WELL TO PERFECTLY	55	82	67
LITTLE OR NOT AT ALL	45	18	33
PERCEIVED UTILIZATION OF TRAINING:			
FAIRLY WELL TO PERFECTLY	55	69	50
LITTLE OR NOT AT ALL	45	31	50
SENSE OF ACCOMPLISHMENT GAINED FROM WORK:			
SATISFIED	58	68	50
NEUTRAL	16	10	0
DISSATISFIED	26	23	50
REENLISTMENT INTENTIONS:			
YES, OR PROBABLY YES	58	61	34
NO, OR PROBABLY NO	23	12	50
PLAN TO RETIRE	19	27	17

IMPLICATIONS

This survey was initiated to provide current job and task data for use in evaluating the AFMAN 36-2108 *Specialty Description* and appropriate training documents

Survey results clearly indicate that the present classification structure, as described in the latest specialty description, accurately portrays the jobs performed in this career ladder. For the most part, the merged job structure seems to be working quite well. Career ladder training documents appear, on the whole, to be well supported by survey data. As was pointed out in the **JOB SATISFACTION ANALYSIS** section, job satisfaction responses by AFSC 3E1X1 personnel have increased since the merger, and most individuals reported the utilization of training is adequate, thus indicating support for the overall training system. Additionally, the career ladder progression is good, with the move from technical work at the 3- and 5-skill levels to supervisory and management at the 7- and 9-skill levels.

APPENDIX A

SELECTED REPRESENTATIVE TASKS PERFORMED BY SPECIALTY JOB GROUPS

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TABLE A1

ENTRY LEVEL JOB
(ST094, N=100)

	REPRESENTATIVE TASKS	PERCENT MEMBERS PERFORMING
F208	Remove or replace three-phase electric motors	90
F196	Measure and cut copper tubing	84
F180	Flare copper tubing	84
F175	Braze, weld, or silver solder lines or fittings, such as condensers, receivers, evaporators, tubing, or piping	82
F174	Bend copper tubing	81
G248	Clean air filters	79
G360	Remove or replace belts or belt guards	78
G291	Install air filters	76
G219	Adjust drive belt tension	75
F177	Clean drains on HVAC/R equipment	74
G265	Inspect air handler fans	67
G273	Inspect drive belts	66
F178	Clean strainers	66
G235	Align and tighten V-belts	66
G238	Align motors	66
F197	Measure and cut pipe by hand	65
H513	Reset circuit breakers	64
H510	Remove or replace fuses	64
F204	Remove or replace gauges	63
F205	Remove or replace piping or tubing, such as water, refrigerant, or fuel lines	63
G249	Clean air handlers	62
H435	Inspect fuses or circuit breakers	62
L829	Locate refrigerant leaks using soap solutions	61
F212	Thread pipe by machine	61
H474	Perform electrical troubleshooting of air conditioning systems	60
H446	Install electrical motors	60
F198	Measure and cut pipe by machine	59
S1174	Fire weapons for qualification, such ad M-16 rifles or .38-caliber pistols	59
G280	Inspect motor or fan bearings	57
L828	Locate refrigerant leaks using electronic or halide-leak detectors	57
G239	Align pulleys	57
H524	Troubleshoot electrical circuits	57
F210	Swage copper tubing	57
F182	Inspect gauges or lines	54
H433	Inspect electrical wiring or connections	54
H431	Inspect electrical motors	54
F187	Install check valves	54
F185	Install air bleed valves	54
G357	Remove or replace air filters, other than on air	53

TABLE A2

GENERAL HVAC/R TECHNICIAN CLUSTER
(ST105, N=473)

REPRESENTATIVE TASKS		PERCENT MEMBERS PERFORMING
F208	Remove or replace three-phase electric motors	97
F180	Flare copper tubing	96
F196	Measure and cut copper tubing	96
F174	Bend copper tubing	93
F175	Braze, weld, or silver solder lines or fittings, such as condensers, receivers, evaporators, tubing, or piping	93
F205	Remove or replace piping or tubing, such as water, refrigerant, or fuel lines	92
H510	Remove or replace fuses	90
G238	Align motors	90
G235	Align and tighten V-belts	89
F182	Inspect gauges or lines	88
G219	Adjust drive belt tension	88
F197	Measure and cut pipe by hand	88
G248	Clean air filters	88
G239	Align pulleys	88
F177	Clean drains on HVAC/R equipment	88
F178	Clean strainers	87
F173	Assemble high- or low-pressure fittings	87
H446	Install electrical motors	87
F212	Thread pipe by machine	86
F204	Remove or replace gauges	86
G360	Remove or replace belts or belt guards	86
G280	Inspect motor or fan bearings	86
F187	Install check valves	86
G273	Inspect drive belts	85
H526	Troubleshoot electrical motors	85
G401	Service fans or blowers	85
H512	Remove or replace single-phase electrical motors	85
H513	Reset circuit breakers	85
G291	Install air filters	85
H435	Inspect fuses or circuit breakers	84
G368	Remove or replace fans or blowers	84
H524	Troubleshoot electrical circuits	84
H431	Inspect electrical motors	84
H474	Perform electrical troubleshooting of air-conditioning systems	83
G265	Inspect air handler fans	83
G249	Clean air handlers	83
F198	Measure and cut pipe by machine	83

TABLE A3

STEAM AND HOT WATER JOB
(ST147, N=5)

	REPRESENTATIVE TASKS	PERCENT MEMBERS PERFORMING
F187	Install check valves	100
F189	Install high-pressure safety valves	100
F173	Assemble high- or low-pressure fittings	100
F204	Remove or replace gauges	100
F203	Remove or replace flange gaskets	100
F186	Install black iron steam condensate lines	100
F178	Clean strainers	100
F196	Measure and cut copper tubing	100
F179	Fabricate copper tubing systems	100
F174	Bend copper tubing	100
G389	Remove or replace steam heating system pressure relief valves	100
F180	Flare copper tubing	100
F207	Remove or replace steam heating system valves or fittings, other than safety or pressure relief	80
F205	Remove or replace piping or tubing, such as water, refrigerant, or fuel lines	80
F206	Remove or replace pressure regulators, such as air, water, refrigerant, or crankcase regulators	80
G248	Clean air filters	80
F182	Inspect gauges or lines	80
G390	Remove or replace steam heating system safety valves	80
F212	Thread pipe by machine	80
F175	Braze, weld, or silver solder lines or fittings, such as condensers, receivers, evaporators, tubing, or piping	80
G373	Remove or replace hot water valves	80
F198	Measure and cut pipe by machine	80
G285	Inspect steam traps	80
F184	Inspect safety valves	80
F188	Install distribution lines on HVAC/R systems	80
K800	Troubleshoot steam heating systems or boilers	80
F208	Remove or replace three-phase electric motors	60
I680	Remove or replace threaded fittings	60
F183	Inspect refrigeration or air-conditioning system component mountings	60
G291	Install air filters	60
G392	Remove or replace steam valves	60
G376	Remove or replace HVAC/R water valves	60
F177	Clean drains on HVAC/R equipment	60
F197	Measure and cut pipe by hand	60
F185	Install air bleed valves	60
B38	Brief customers on equipment discrepancies or repairs	60
F181	Identify high- or low-pressure fittings	60

TABLE A4

STEAM PLANT JOB
(ST183, N=40)

	REPRESENTATIVE TASKS	PERCENT MEMBERS PERFORMING
K739	Blow down steam heating system boilers or water columns	98
K764	Inspect steam heating system boiler feed and condensate pumps	98
Q1114	Blow down central steam plant boiler or water columns	98
Q1122	Drain central steam plant boilers	98
Q1115	Check central steam plant boiler water level	93
F212	Thread pipe by machine	93
F207	Remove or replace steam heating system valves or fittings, other than safety or pressure relief	93
K766	Inspect steam heating system boiler safety valves	93
F203	Remove or replace flange gaskets	93
K765	Inspect steam heating system boiler manhole or handhole covers	93
F187	Install check valves	90
Q1126	Inspect central steam plant boiler manholes or handhole covers	90
K783	Perform preoperational checks steam heating system boilers	90
K755	Fill steam heating system boilers	90
Q1154	Remove or replace central steam plant boiler manhole and handhole cover gaskets	90
Q1153	Remove or replace central steam plant boiler gauge glasses	90
F198	Measure and cut pipe by machine	88
Q1127	Inspect central steam plant boilers	88
F173	Assemble high- or low-pressure fittings	88
S1174	Fire weapons for qualification, such ad M-16 rifles or .38-caliber pistols	87
F186	Install black iron steam condensate lines	87
F197	Measure and cut pipe by hand	87
Q1124	Inspect central steam plant boiler feed and condensate pumps	85
K741	Clean feed-water controls, such as McDonnell-Miller	85
P1106	Test pH of condensate returns	85
K740	Check steam heating system boiler tricocks	85
F178	Clean strainers	85
K744	Clean or inspect steam heating system combustion chambers	85
K752	Drain steam heating system boilers	85

TABLE A5

QUALITY ASSURANCE JOB
(ST295, N=6)

	REPRESENTATIVE TASKS	PERCENT MEMBERS PERFORMING
G289	Inspect water pumps	100
G266	Inspect blower bearings	100
G267	Inspect centrifugal water pump operations	100
G276	Inspect hot water coils	100
G281	Inspect or clean ducts	100
G264	Inspect air filtering systems	100
G279	Inspect mixed air systems	100
G280	Inspect motor or fan bearings	100
G273	Inspect drive belts	100
G270	Inspect dampers	100
G269	Inspect damper travels and close offs	100
G265	Inspect air handler fans	100
G274	Inspect dual duct terminal devices	83
G268	Inspect chilled water coils	83
G275	Inspect high-temperature water heating distribution systems	83
G284	Inspect steam heating system expansion joints	83
G271	Inspect dehumidifiers	83
G272	Inspect direct expansion coils	83
G283	Inspect steam coils	83
G277	Inspect humidifiers	83
G285	Inspect steam traps	83
G282	Inspect reheating systems	83
G263	Inspect air dryers	83
H431	Inspect electrical motors	83
G260	Examine mechanical operations of dampers	66
G288	Inspect water expansion tanks	66
C77	Evaluate completed work or work-in-progress	66
G278	Inspect induction terminal devices	66
G286	Inspect VAV reheat terminal devices	66
H432	Inspect electrical power supplies, other than controls	66
H436	Inspect hand-off-automatic switches	66

TABLE A6

SUPERVISOR JOB
(ST069, N=114)

	REPRESENTATIVE TASKS	PERCENT MEMBERS PERFORMING
A27	Participate in general meetings, such as staff meetings, briefings, conferences, or workshops, other than conducting	88
C106	Write EPRs	87
C101	Inspect personnel for compliance with military standards	85
B42	Counsel personnel on personal or military-related matters	83
A10	Determine work priorities	82
C75	Conduct performance feedback worksheet (PFW) evaluation sessions	80
C107	Write recommendations for awards or decorations	78
A4	Coordinate maintenance problems with appropriate offices or organizations	74
B65	Supervise civilians	73
C86	Evaluate personnel for compliance with performance standards	73
B41	Conduct supervisory orientations of newly assigned personnel	73
C102	Inspect shop facilities or equipment	73
C78	Evaluate individuals for promotion, demotion, reclassification, or special awards	73
C77	Evaluate completed work or work-in-progress	72
A23	Establish performance standards for subordinates	70
B48	Direct utilization of personnel	69
B38	Brief customers on equipment discrepancies or repairs	68
B61	Interpret policies, directives, or procedures for subordinates	68
A2	Assign sponsors for newly assigned personnel	68
B70	Supervise military personnel with AFSCs other than 3E1X1	65
A31	Plan or schedule work assignments	65
A26	Establish work schedules	64
C98	Indorse enlisted performance reports (EPRs)	64
C81	Evaluate job hazards or compliance with Air Force Occupational Safety and Health (AFOSH) program	64
S1174	Fire weapons for qualification, such ad M-16 rifles or .38-caliber pistols	64
B67	Supervise HVAC/R Journeymen (AFSC 3E151)	62
B59	Initiate action required due to substandard performance of personnel	62
A1	Assign personnel to duty positions	60
S1170	Don or doff chemical warfare personal protective clothing	58
A36	Write job or position descriptions	58
A35	Schedule personnel for schools, temporary duty (TDY) assignments, or nontechnical training	57
B55	Implement safety or security programs	57
A5	Determine completion time estimates for fabrications or repairs	56

TABLE A7

MOBILITY JOB
(ST052, N=31)

	REPRESENTATIVE TASKS	PERCENT MEMBERS PERFORMING
S1173	Erect tents	96
S1174	Fire weapons for qualification, such ad M-16 rifles or .38-caliber pistols	90
S1170	Don or doff chemical warfare personal protective clothing	90
S1226	Practice personal hygiene techniques	83
S1167	Assemble AM-2 matting for rapid runway repair	80
S1172	Erect camouflage netting	77
S1230	Tear down, inspect, clean, and reassemble weapons, such as M-16 rifles or .38-caliber pistols	74
S1197	Operate portable radios	74
S1204	Pack personal clothing and equipment for deployment	67
S1225	Practice expedient methods	64
S1199	Operate tent heaters	64
S1227	Practice self-protection from extreme weather	61
S1176	Identify and report suspected unexploded ordnance (UXO)	61
S1223	Practice convoy techniques	58
S1175	Identify and report chemical warfare agents	58
S1212	Perform first-aid lifesaving techniques	54
S1169	Construct field fortifications	54
S1168	Assemble or disassemble mobile HVAC/R equipment	51
S1207	Perform cover and concealment techniques for work party security	51
S1209	Perform decontamination procedures for chemical warfare agents	48
S1211	Perform explosive ordnance reconnaissance	48
B64	Read or interpret blueprints, diagrams, drawings, or specifications	45
S1222	Practice communications security (COMSEC) or operations security (OPSEC) during contingency exercises or operations	45
S1203	Pack or palletize contingency equipment	45
S1188	Operate dump trucks for contingency exercises or operations	45
A27	Participate in general meetings, such as staff meetings, briefings, conferences, or workshops, other than conducting	41
S1232	Troubleshoot HVAC/R equipment	41
A4	Coordinate maintenance problems with appropriate offices or organizations	38
S1220	Practice base denial techniques	38
S1194	Operate immersion heaters	38
S1189	Operate field bath units	38
S1186	Operate cargo trucks for contingency exercises or operations	38
S1187	Operate chemical warfare personnel protective equipment	35
S1219	Perform weapons fire control	35
S1205	Palletize mobile HVAC/R equipment	35
S1191	Operate forklifts for contingency exercises or operations	35

TABLE A8

FUNCTIONAL MANAGER JOB
(ST132, N=6)

	REPRESENTATIVE TASKS	PERCENT MEMBERS PERFORMING
B39	Compile information for reports or staff studies	100
C108	Write special reports, surveys, or staff studies, other than training reports	100
A30	Plan or prepare briefings	100
A27	Participate in general meetings, such as staff meetings, briefings, conferences, or workshops, other than conducting	100
A16	Draft budget or financial requirements	100
A15	Draft agenda for staff meetings, conferences, workshops, or symposiums	83
B40	Conduct general staff meetings, briefings, conferences, or workshops	83
A10	Determine work priorities	83
A34	Review drafts of regulations, manuals, or other directives	83
C74	Conduct facilities surveys	66
C76	Evaluate budget or financial requirements	66
E168	Review WIMS outputs	66
B61	Interpret policies, directives, or procedures for subordinates	66
A17	Draft proposals for improvement of maintenance procedures	66
A22	Establish organizational policies, such as operating instructions (OIs) or standard operating procedures (SOPs)	66
B64	Read or interpret blueprints, diagrams, drawings, or specifications	66
E159	Perform Work Information Management System (WIMS) inquiries	50
A6	Determine cost estimates for fabrications or repairs	50
A8	Determine requirements for space, personnel, equipment, or supplies	50
A28	Plan layouts of facilities for installation of equipment, other than HVAC/R equipment	50
E147	Maintain administrative files	50
C80	Evaluate inspection reports or procedures	50
A36	Write job or position descriptions	50
C92	Evaluate suggestions	50
A4	Coordinate maintenance problems with appropriate offices or organizations	50
B65	Supervise civilians	33
E171	Update WIMS data	33
C83	Evaluate maintenance or utilization of equipment, supplies, or workspace	33
A11	Develop organizational or functional charts	33
A19	Establish facility inspection systems	33
B52	Implement organizational policies, such as OIs or SOPs	33
B43	Direct development or maintenance of status boards, graphs, or charts	33
C72	Analyze production reports or records	33